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CLIENT/SERVER

FEBRUARY 1995

JOURNAL

Can DCE Deliver?

ALSO IN THIS ISSUE:

- **BANKING ON CLIENT/SERVER**
- **DATA MODELING**
- **DEALING WITH MERGERS AND ACQUISITIONS**





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COVER STORY

Can DCE Deliver?

28 After spending more than two years and tens of millions of dollars building a distributed computing infrastructure with The Open Software Foundation's Distributed Computing Environment, Charles Schwab & Co. has little more than a distributed printing application — and numerous scars — to show for its efforts. Schwab is moving ahead — albeit cautiously — with DCE, as are numerous other pioneers. But they're all wrestling with the same question: Will DCE ever live up to its billing as an all-encompassing technology for building next-generation distributed applications? *By Jean S. Bozman*



20 Synergistic Stress



The urge to merge has once again become corporate America's obsession. Some recently merged organizations are finding that well-scoped, modularly designed client/server infrastructures enable them to incrementally add IS capacity with minimal redesign to ease the melding process. But it's not a slam dunk. For starters, many 'open' client/server applications lack the integration tools or interfaces to connect with other environments.

By Alice LaPlante

20 Kneading a merger strategy

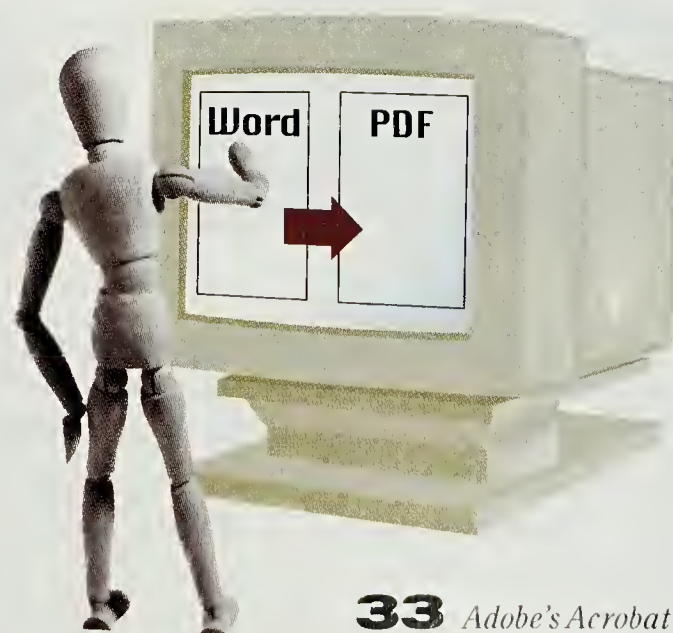
25 Outnumbered And Overburdened

Client/server vendors are multiplying faster than bunnies in the meadow. How can a downsized IS shop make sure it selects the most viable suppliers? How do you protect yourself from upstarts that go belly-up? Veteran IS managers suggest you ask vendors a lot of hard questions about products, references and customer support. It also helps to place the vendor's source code in escrow. *By Steve Alexander*

33 Dishing Out The Documents

Keeping track of documents is a tedious, time-consuming chore that the advent of word processing did little to help. But companies, in their efforts to improve worker productivity and achieve a faster time to market for their products, are finding that client/server networks ease access to the corporate information stored in documents.

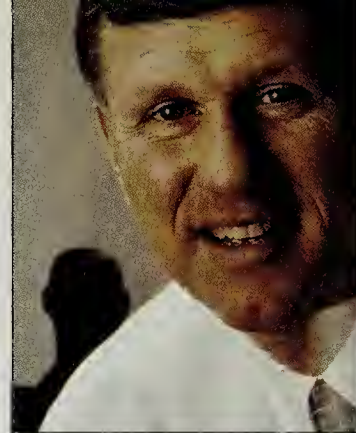
By Lynda Radosevich



33 Adobe's Acrobat

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56 Unifi's Ralph Mayes

44 One Bit At A Time



Successful data modeling can set the pace for an organization's migration to client/server. But be forewarned: Muddled data modeling will have users and executives digging in their heels against the aggravation and high cost of a failed transition. You must pick the right tools and approach and make it clear that individual departments can no longer 'own' data.

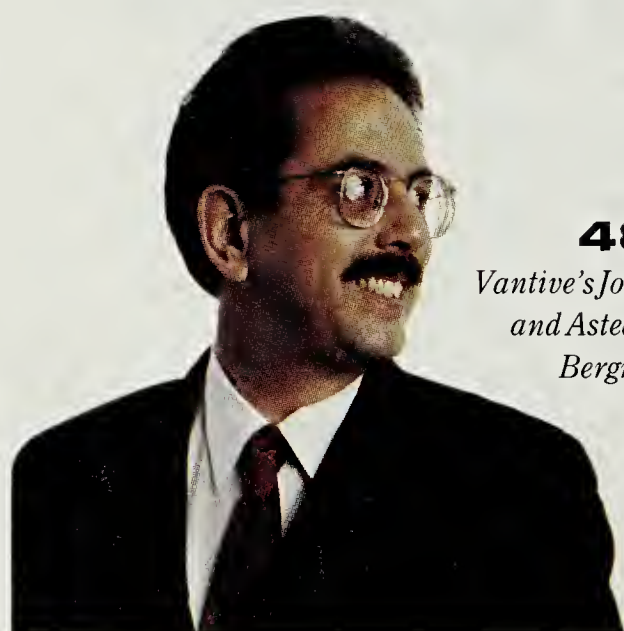
By Avery Jenkins

44 Data modeling

48 Customer-Facing Fray

In the market for customer service and support systems? The options are mind-boggling. To help sort things out, we present two contrasting points of view from client/server-pure upstart The Vantive Corp. and old, reliable, battle-tested Astea International, Inc. Hope this clarifies things!

By Rosemary Cafasso



48
Vantive's John Luongo
and Astea's Zack
Bergreen



52 Capitalizing On Client/Server

Banks can no longer count on earning money the old-fashioned way. Many are deploying client/server networks to help them provide new revenue-generating products and services while streamlining costs.

By Thomas Hoffman

56 Cutting A New Cloth

CASE STUDY

Unifi, Inc. intends to spend in excess of \$10 million in the next three years building a client/server architecture to improve its global competitiveness in the cut-throat textile industry. The \$1.4 billion firm's goal: to weave new business processes with a distinct, distributed computing flare to provide knowledge workers with cross-functional access to business-critical information. *By Alan Alper*



Insights. Las Vegas resort holding company bets heavily on client/server. Page 15. Project Periscope. Page 16. Continental Airlines readies object-oriented ticketing, check-in system. Page 18.

Quick Takes. An Xcellent Client? Page 41.

Perspectives. Building three-tier, OLTP applications requires a detailed assessment of what you're trying to accomplish and the technologies that can get you there. *By Sally Cusack.* Page 19. Robust and capable 4GL development tools are here. *By Judith Hurwitz.* Page 43. You can prevent the old garbage-in, garbage-out syndrome when building new client/server applications if you provide rigorous project management discipline. *By Shaku Atre.* Page 58. Building a client/server culture requires effective, consistent communication. *By Eric Singleton.* Page 67.

What's New. Internet access and administration is made easier with Spry tools. *By Christopher Lindquist.* Page 59. Networking news from TGV, Net-Frame, Digital and Security Integration. Page 60. **Firing Line:** Novell's NetWare 4.1 *By Elisabeth Horwitt.* Page 62.

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EDITOR'S NOTE

Alan Alper

**Budding enter-
prisewide
client/server
networks need
to be flexible
and open
enough to
accommodate
ever-changing
business and
technological
requirements.**

Merger and acquisition mania is once again sweeping corporate America. But unlike the frenzied wheeling and dealing of the mid-1980s — when the driver was asset value — today's acquisitions are predicated on increasing market share, buying complementary products or services and broadening geographic reach.

What does this mean for distributed computing, you might ask? It means that budding, enterprisewide client/server networks need to be flexible and open enough to accommodate ever-changing business and technological requirements. It also means that existing environments, if not properly planned and ar-

chitected, may not be open enough or scalable enough to permit acquired operations to be seamlessly melded.

Unfortunately, information architectures are rarely given much consideration by the investment bankers, lawyers and horse traders who make these deals click. Perhaps this is why many acquisitions fail to live up to their advanced billing?

Our lead story ("Synergistic Stress," page 20) explores how some recently acquired and/or merged organizations are blending disparate information architectures into uniform, distributed computing environments. Some believe you need to tear down the acquired company's environment and create a mirror image of your own. Others say that building multilayer client/server architectures with open APIs is the way to go.

Clearly, the job is tougher if you haven't created an enterprisewide road map. As our piece on data modeling indicates ("One Bit At A Time," page 44), building a client/server network can be nearly impossible if you haven't figured out where your data resides, how it flows through your organization and whether it maps at all with your business processes.

There's a multitude of modeling approaches and tools to consider. The key is to pick an approach that fits with the way your organization works and to realize that many of the tools are not quite as robust as you would like.

.....

CLIENT/SERVER JOURNAL IS CONSTANTLY REFINING AND MODIFYING THE way we cover client/server. We receive innumerable phone calls, letters, messages and faxes to explore the "people" side of distributed computing. Our response: We'll publish a "careers" section in every issue beginning with the April edition. This section will explore the severe client/server skills shortage that constrains many organizations' ability to successfully implement client/server. We'll focus on how to teach old programmers new tricks and how to recruit and retain people key to your distributed computing endeavors.

As always, your suggestions help us deliver useful information. Drop me a line at any of the addresses at the bottom left if you have any recommendations. ■

INTERNET: aalper@cw.com

Letters

I READ THE NOVEMBER 1994 *Client/Server Journal* cover story with great interest. I applaud Frank Petersmark's accomplishment in advancing Amerisure's commercial lines underwriting and rating processes from back-office operations to the desktop. I am also very proud of the fact that Programming Resources Co. could be part of Mr. Petersmark's successful client/server strategy. I do, however, want to point out several inaccuracies regarding the "new system's heart."

GEN-A-RATE (proper spelling) is not an "off-the-shelf" software package! It is a fully customized insurance rating and policy issuance application, uniquely defined per individual client specifications.

I also take issue with the author's statement that GEN-A-RATE "had too many technical limitations." Many of Programming Resources' corporate clients have successfully developed client/server applications with it.

STEVEN R. WEBER
President
Programming Resources Co.
Hartford, Conn.

Editor's reply: Our mistake on the name and off-the-shelf characterization of the package. However, it was Amerisure that said the software had limitations.

I N HIS ARTICLE TITLED "Database Dilemma," Jim Stikeleather [CSJ, November 1994] states that object databases "should" exhibit superior performance in comparison with relational databases. In actuality, most applications that migrate from relational to object databases run into performance prob-

lems. Inefficient database design is usually the culprit.

The basis for migration to object databases should be ease of modeling and faster application development cycles rather than speed advantages.

MAHESH NARAYAN
Partner
Odyssey Systems, Inc.
Nutley, N.J.
72233,64@compuserve.com

I NOTICED WHAT MAY HAVE BEEN an error in the "Tech Cures on Tobacco Road" article in the November issue. The article made reference to The Liggett Group's having purchased PeopleSoft, Inc.'s HRMS package.

It's my understanding that Liggett purchased Automatic Data Processing, Inc.'s ADP/CSS HRMS product (which contains PeopleSoft's source code) and that SHL Systemhouse, Inc. was going to run the project.

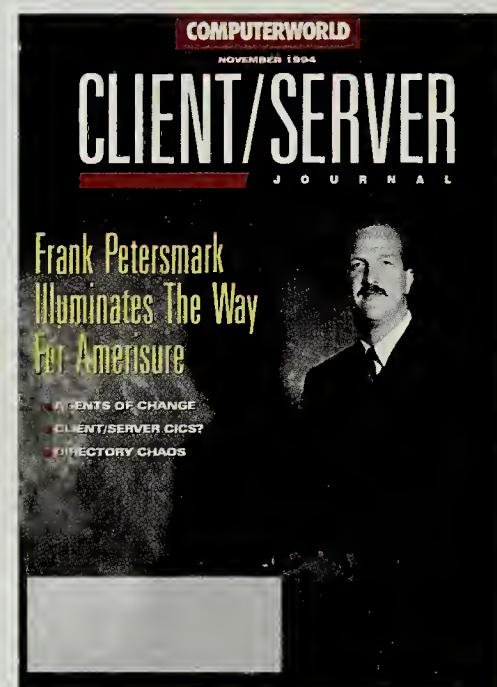
JAMES A. MORRONE
President
PeoplePros, Inc.
Greensboro, N.C.

Editor's reply: You are correct about ADP but not about SHL Systemhouse, which provided contract workers and financing for the project.

I ENJOY READING *COMPUTERworld Client/Server Journal*. I have a suggestion, however: Please put the date of the magazine on each page of copy! It is a minor inconvenience that you could easily remedy.

Keep up the good work.

CAROL L. SMITH
Business consultant



Monsanto Agricultural Group
St. Louis

clsmi@ccmail.monsanto.com

Editor's reply: Great suggestion! See this issue.

K UDOS TO YOU ON YOUR ARTICLE "Stuck in the Middle" [CSJ, November 1994]. Having spent the last 30 years of my career as a systems designer or systems integrator, I have not particularly liked the normal, restrictive definition of client/server.

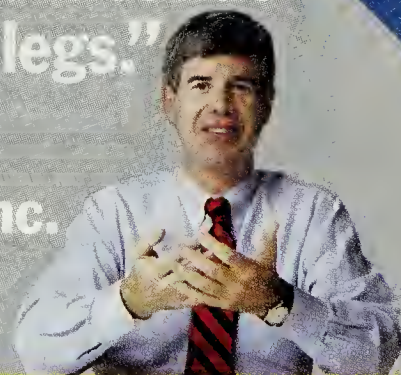
But isn't it time to realize that a computer is capable of doing useful work, whether it is a PC, a minicomputer or a mainframe and no matter what operating system is running on that computer? The key is to be able to communicate between — and coordinate the activities of — these computers.

DICK SYNORADZKI
Principal
Linc Systems Corp.
Bloomfield, Conn.

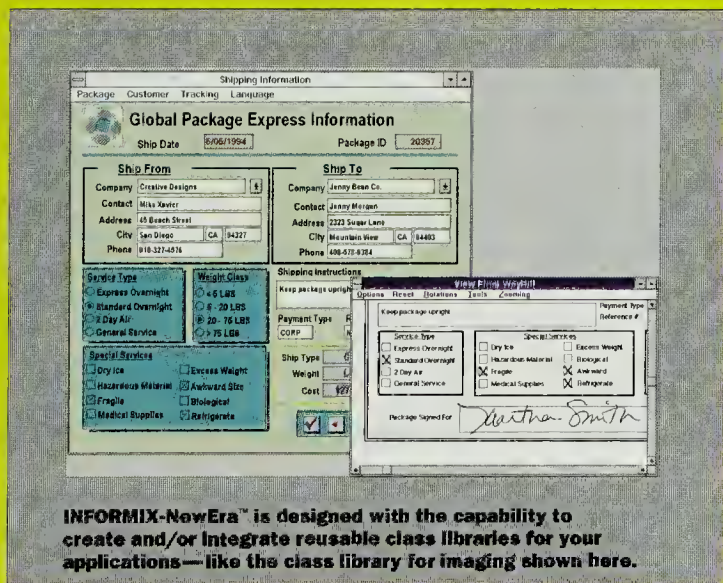
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Judith Hurwitz, President, Hurwitz Consulting:

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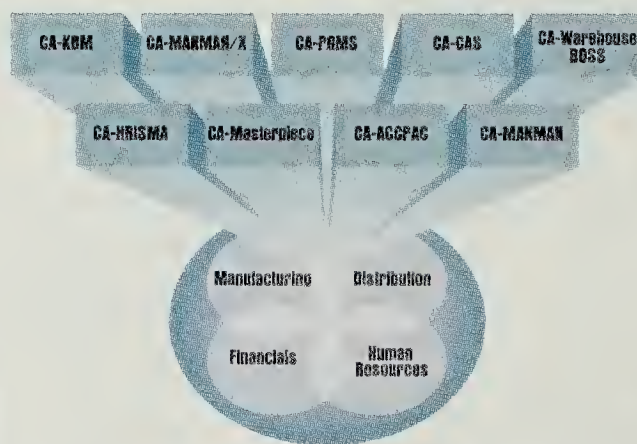
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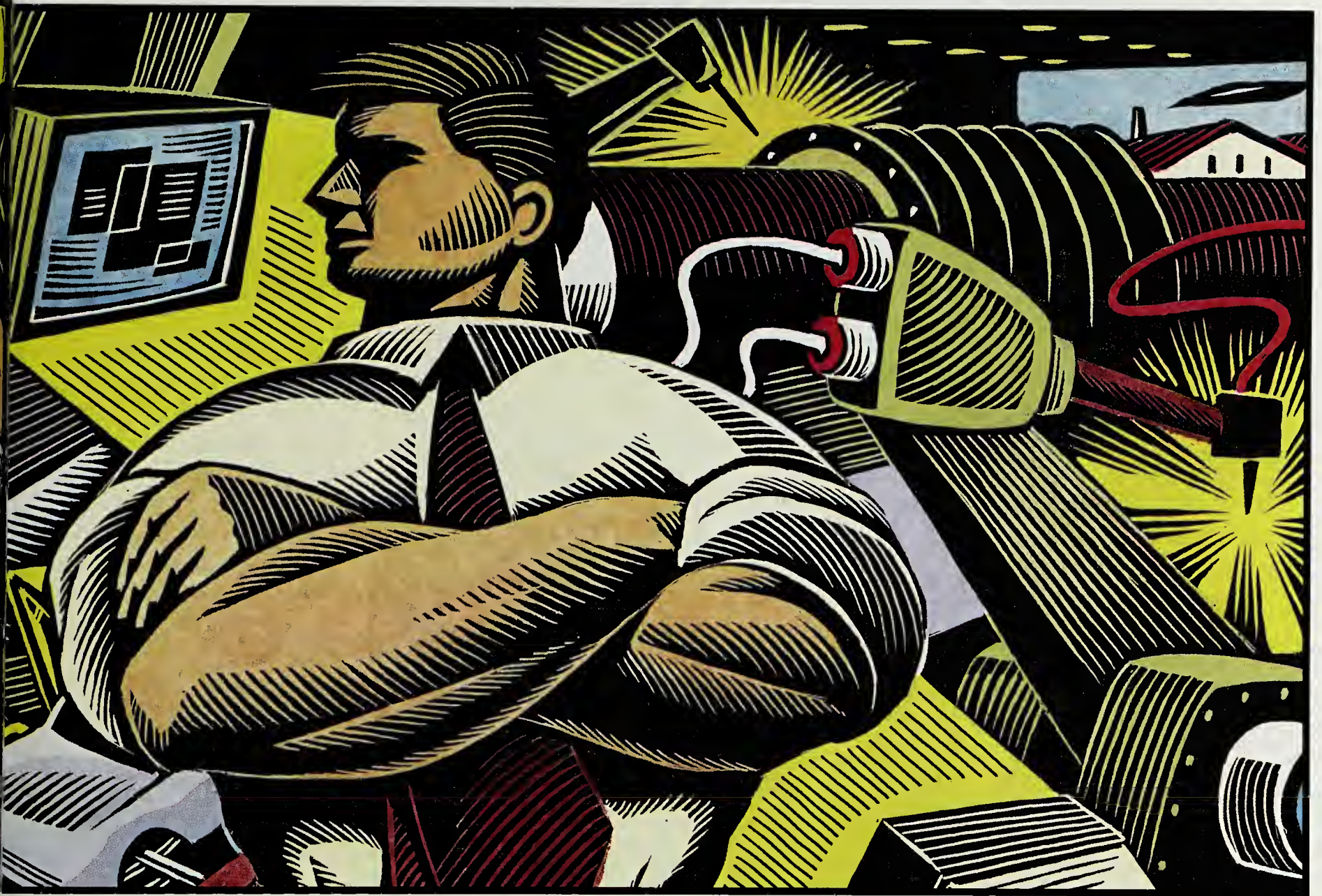
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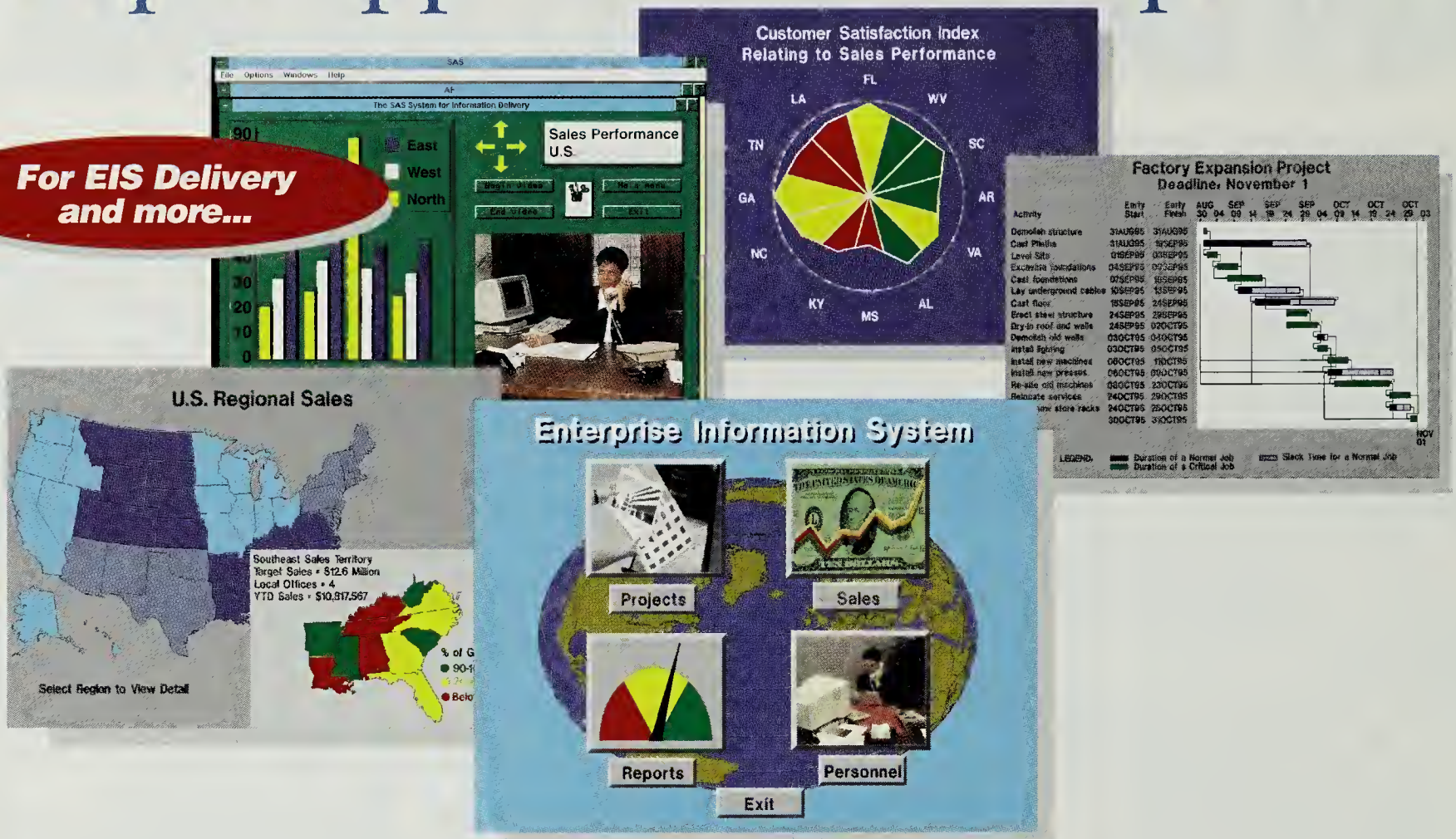
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INSIGHTS

A QUARTERLY REVIEW OF CLIENT/SERVER VIEWS AND EVENTS

Mirage Resorts to Client/Server

Las Vegas resorts spend lavishly on guest comforts and atmospherics. The theory: The more plush the accommodations, the more inclined people will be to gamble. And gamble big.

The same normally doesn't go for business information systems. Many resort operators stick with monolithic, stove-pipe architectures that cater to stand-alone business functions. Until recently.

Mirage Resorts, Inc., a billion dollar-plus resort holding company that manages the Mirage and other resorts, is betting that client/server can help deliver improved guest services. It also hopes to make managers and operations staffers more productive and help them make better, quicker decisions with near real-time access to enterprise data.

Last month, Mirage went live with a system built using Microsoft Corp.'s Visual Basic to analyze product sales at the company's 50-plus gift shops. The goal: help buyers and managers stock appropriate merchandise and receive quicker inventory turns.

Business results are extracted daily from a Unix-based Data General Corp. Avilion system over a TCP/IP network onto an Intel Corp.

I486-based server running Microsoft's Windows NT and SQL Server 95. The data is analyzed on PCs running Microsoft's Excel.

"Users can drill down, for example, to see what size of what T-shirt sold well in what color, in what store, sold by what vendor," said Walid Abu-

structures needed to keep the resorts near 100% occupancy.

The 9-month-old system is already having an impact. "Management recently said the application resulted in a revenue increase of \$5 million for 1994," said Julie Koentopp, IS project manager.

Mirage hopes to eventually replace its hodgepodge of platforms with a consistent client/server architecture built around Microsoft prod-



Mirage Resorts hopes to make its disparate platforms more consistent

Hadba, a Microsoft consultant involved with the project.

Meanwhile, a Visual Basic-built yield management system is enabling Mirage to maximize room occupancy and rates while matching guests' budgetary and travel needs. The system pulls reservation data off a Tandem Computers, Inc. database, allowing management, for instance, to forecast the types of rate

ucts and jointly developed solutions. It is even exploring moving its reservation system to client/server. "Our success is helping to educate executive management on how technology can be an enabler to business improvement," said Karen Bozich, systems development manager. ■

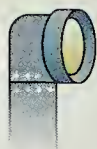
Alper is editor of Computerworld Client/Server Journal.



A management caveat: One reason client/server fails is because firms focus on the "hard" issues of technology and processes and don't give enough attention to the "soft" human and behavioral changes that go along with it. This was one conclusion drawn from "The Impact of Client/Server Technology on Organizational Culture," by Diana Bander Associates in Burlington, Mass.

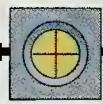
"Did your client/server solution increase profitability?" Forrester Research, Inc. in Cambridge, Mass., asked this question of 42 business and information technology managers at companies with open systems in use, and their answer was yes. However, these companies have two things going for them: The technology is implemented together with other business changes, and business and IS professionals work together to make it happen.

Like children, senior managers have big fears — of implementing new paradigms and technologies. An article in the November issue of "American Programmer" said these fears are a big impediment to the adoption of client/server — they can keep a project from getting off the ground. Up-front evaluation to overcome these fears may be as valuable to a client/server project as all the work done to build the system.



Project Periscope

HR PRINTS GROWTH PATTERN



On the human resources front, Chicago-based commercial printer R. R. Donnelly & Sons Co. has signed a \$650,000 contract with SAP America, Inc. SAP's R/3 Human Resources Management System will allow Donnelly to implement business modeling capabilities to test the impact growth and change will have on the organization and its resources. The system will also give Donnelly's management feedback to help it determine company direction and anticipate changes. Now being implemented, the HRIS project will ultimately support more than 30,000 employees. Donnelly is planning to pilot its alpha and beta tests in the second quarter of this year and then roll it out from there.

DISTRIBUTED POLICIES

Chicago-based CNA Insurance Cos. has signed a multi-million-dollar contract with Sybase, Inc. for a distributed insurance claims processing and information system. CNA is hoping to provide increased functionality to more than 3,000 claims adjusters and risk managers across the U.S. CNA's system will eventually include Sybase's System 10, Replication Server and SQL Server Monitor software running on AT&T Global Information Solutions workstations. In the next nine to 12 months, CNA will roll out a number of new applications to increase functionality on the desktop. The first application in use is a forms-based application for keeping a legally required diary on each of CNA's clients. Subsequent releases

will be other regulatory forms creation, work queues and other productivity tools.

DRIVING OREGON'S DMV

After some 25 years, the Oregon Department of Motor Vehicles (DMV) has decided that it's time for a change. To move away from its antiquated system of highly disparate databases that don't interact with one another, the DMV chose IBM as its technology partner under a five-year contract, which started in February 1993. To date, IBM has installed 450 PS/2 workstations running OS/2 in 65 field offices, with an additional 250 PS/2s installed at DMV headquarters in Salem, Ore. By

July 1994, 42 RS/6000 servers were in place to support the new client/server licensing and registration system being written. If all goes according to plan, the application's first release will be this spring; the final release is set for the spring of 1997. So far, the only glitch has been the unexpected presence in the old systems of assembler code, which has caused delays while the DMV has struggled to find assembler programmers to integrate the new application. The DMV is using IBM's DB2 on MVS and AIX as the relational database. IBM's VisualInfo will be implemented as the imaging platform by late this year. The DMV expects to reap such benefits as an annual savings of millions of dollars; faster and more accurate

service to customers; and electronic distribution of documents, which would eliminate the paper-based system the DMV currently uses.

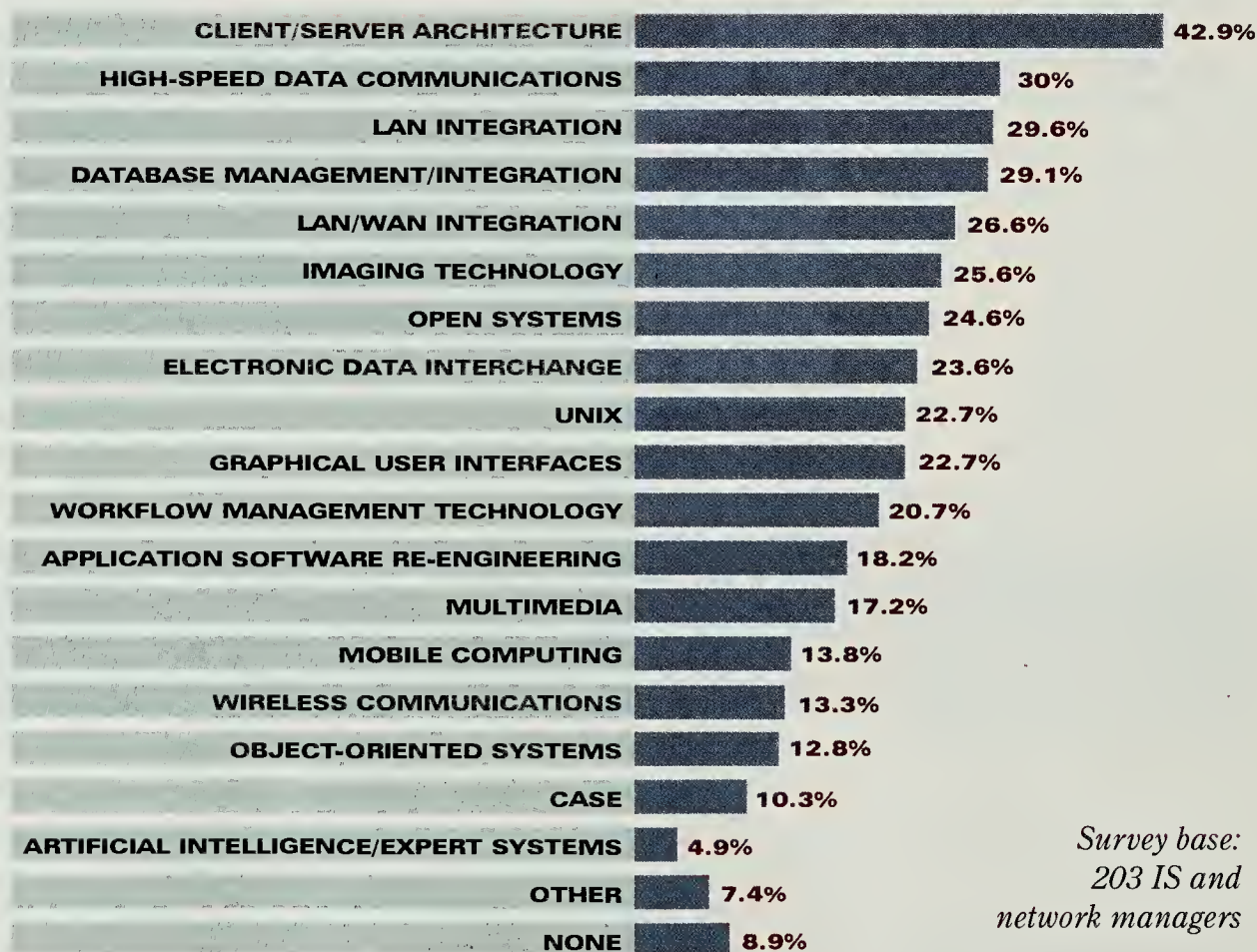
BANKING ON THE DODGE GROUP

The First National Bank of Chicago has joined ranks with such companies as Sun Life Assurance Company of Canada and The Bank of Paris in a vote of confidence for The Dodge Group. First Chicago has licensed the first module of The Dodge Group's OpenSeries client/server-based accounting software. Starting with the Travel and Expense accounting module, First Chicago is betting on OpenSeries for its bankwide re-engineering of numerous accounting and administrative processes.

AT YOUR SERVICE

Not surprisingly, moving to client/server is the major impetus behind contracting with networking experts — mainly because the technology is so dependent on a robust network

PERCENTAGE OF CUSTOMERS DEMANDING NETWORK INTEGRATION/OUTSOURCING SERVICES



*Survey base:
203 IS and
network managers*

Source: Dataquest, Inc., Framingham, Mass.

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Objects to Ease Airport Check-in



When the new Denver International Airport finally opens, chances are Continental Airlines passengers will be treated to ticketing and check-in procedures that are as easy as playing Nintendo.

The airline has spent the past year testing an airport automation system based on object technology from Objective, Inc. The financially struggling airline was looking for a system that could help it save money, collect missed revenue, raise the level of productivity for agents and simplify training, without having to recreate its legacy system.

"Every time an airline agent touches a keyboard, there is the potential to lose money because of doing something wrong," such as incorrect currency conversion or refunding nonrefundable tickets, said Bernadette Reiter, president of Boulder, Colo.-based Objective.

Instead of using typically cryptic airline industry commands, the new system, called ASAP, uses objects to represent various business process-

es. For example, one of the roughly 4,261 objects in the system knows how to validate credit cards, another object knows how to talk to the Oracle Corp. database, and another talks to the graphical user interface. This allows even the most novice agent to do complex transactions, increasing agent productivity and cutting training time 60% to 70%, which of course all contributes to Continental's bottom line.

Keeping the front end in English also helps. Now when a passenger says he wants to go to Chicago, the agent types in "Chicago," not "ORD" — the airline code for Chicago —

on an AT&T Global Information Solutions 486-based PC.

Objects are sent via a Novell, Inc. NetWare 3.12 server over a communications gateway to Continental's mainframe reservation system, which translates the English into airline code for the IBM host. When the screens come back to the PC from the host, the object software translates the code back into English.

The software then repackages the information, such as a passenger list, and writes it out to an Oracle database server. From here, the PC works exclusively with the database.

All of this lends itself to a speedier process for both passenger and agent at the airport terminal. For example, customized pictures on the client system show agents what a transaction means, such as graphically depicting available seats on a particular flight.

Continental's outsourcer, Electronic Data Systems Corp., is handling implementation of the system, which is currently deployed in seven airports and training centers. ■

Written by Catherine McCrorey, managing editor of Computerworld Client/Server Journal.

WATCH YOUR BACK

The following is a checklist of initiatives, recommendations and concerns about securing your client/server world. It is adapted from "Computer Security Alert," a newsletter published by the Computer Security Institute in San Francisco.

■ RISK AND PROTECTION

MODELS: Develop risk and protection models at both the enterprisewide and individual LAN levels.

■ ENTERPRISEWIDE

SECURITY ARCHITECTURE:

Your existing security model is about to be twisted beyond recognition by the move to client/server.

■ REEVALUATE CURRENT

SECURITY: Reevaluate all current policies and procedures.

■ THOROUGH CONTROL:

Client/server applications should be controlled from end to end.

■ ONETIME PASSWORDS:

Reusable passwords should be used only in circuit-switched networks.

■ DATABASE CONTROL:

Encourage control at the database element level (i.e., tables and views).

■ MULTITASKING OPERATING SYSTEMS AT THE WORK-

STATION: Prefer preemptive vs. cooperative multitasking. Cooperative means the way one process gets control is that another gives it up. Preemptive means the highest priority process takes control whenever it needs it.

BUZZWORDS

A compendium of recently generated buzzwords:

■ **MULTITECHNOLOGY CULTURALISM:** No one vendor has overwhelming dominance at user sites.

■ **GLASS CLOSET:** Where the servers reside.

■ **VLDB:** An acronym taken from the scientific/technical computing arena to represent very large databases that contain at least 500G bytes of data or more than 1 million rows.

Three-tier Reality

BY SALLY CUSACK

"It just wouldn't scale" is one lament heard from users faced with thousands of dollars in lost application development costs.

Application development environments that are capable of providing client/server capabilities across three-tier, on-line transaction processing (OLTP) architectures are just becoming a reality. Users who had initially wanted to abandon the mainframe soon learned that some of the more unglamorous aspects of this domain — i.e., transaction processing monitors — provided reliability and stability that could not easily be duplicated in the two-tier client/server models.

The trouble lies in trying to build from the bottom up with tools that are either too immature or too limited. While tools such as Powersoft's PowerBuilder and Microsoft's Visual Basic provide robust, graphical user interface-centric development environments for the two-tier world, trying to move these applications past this model has, until now, proven difficult.

Fortunately, however, there are now application development environments capable of scaling applications fully across a three-tier platform. These development tools are necessary to achieve true OLTP in client/server environments.

Several vendors — Dynasty Technology, Forte Software, IBM, Seer Technologies and Uniface — are vying for the title of "most desirable" three-tier tool provider. Most of the players, however, have primary features in common — automatic data partitioning and code generation across heterogeneous platforms.

The Dynasty development environment, for example, generates C, SQL and middleware APIs and supports both Novell's Tuxedo and IBM's Encina transaction monitors. However, support is presently defined as users writing 3GL code to the monitor.

Two New York companies, meanwhile, are going about

things differently.

JYACC's JAM 6 application tool kit contains JAM/TPI, which integrates the JAM 6 user interface and relational database with the Tuxedo transaction monitor environment. In addition to providing core OLTP capabilities, the product's true beauty lies in its simplicity: Users are not required to know either the Tuxedo API or C programming techniques. JYACC rolled out a similar product in support of Encina in the fourth quarter of last year and will roll out a product to support IBM CICS/6000 in the second quarter of this year.

Magna Software's Magna X, aimed at the Cobol community, allows developers to

build applications that can access Unix and mainframe data from any environment. The product supports Tuxedo and will eventually support Encina as well.

To narrow down the playing field, users should ask themselves these questions:

- Does your environment require monitor support?
- Can you define which applications services are needed on both the front and back end?
- Do you need Cobol or C generation?
- Do you have the time and money to retrain developers?

If you answer "no" to the last question, your organization may be a good candidate for one of the three-tier application development environment tools. While these products are somewhat expensive, they do most of the work behind the scenes, freeing up developers to work with end users and thus creating more streamlined applications.

Perhaps then, as one industry pundit observed, replacing your mainframe with client/server wouldn't so much resemble a farmer replacing his team of oxen with 10,000 chickens. ■



Cusack is a market analyst at The Standish Group International, Inc. in Dennis, Mass.

**THE URGE
TO MERGE OFFERS
DISTRIBUTED COMPUTING
CHALLENGES, OPTIONS**

SYNERGISTIC STRESS

Archie Karel didn't want the job of running one of the suburban bakery cafes of the St. Louis Bread Co. Not at first.

Karel, an experienced restaurant manager employed at another local St. Louis eatery, refused invitations to interview for the position until word came down that the small chain of regional, full-service bakeries had been acquired by Boston-based Au Bon Pain, Inc.

"I heard that they were going to start growing the business more rapidly, that they were willing to pay higher salaries for more experienced people and that they were going to update their production planning and [point-of-sale] systems," Karel said.

Karel joined the ranks 15 months ago, and he's particularly delighted with the distributed technology tools Au Bon Pain has put in his hands.

"Before, we had to depend on the computer in the home office to do production planning. Our daily baking schedule was 'force fed' to us based on overall corporate sales trends," Karel said.

Today, however, Karel controls the destiny of his own store. Au Bon

Pain's Boston-based Unix server collects the day's register data at closing and uploads it to an Oracle Corp. database, which in turn calculates myriad sales- and production-related reports. By 7 a.m. the next morning, Karel can query the database for current and historical trends and use the data to run various PC-based planning, inventory and baking applications that help him bake the right type and quantity of goods for his store's specific needs.

"We took a five-year jump in six months," marveled Billy Klearman, head of St. Louis Bread's information systems group in St. Louis, referring to the client/server capabilities that Au Bon Pain has pumped into his company since acquiring it for \$24 million in November 1993. "It's been quite a ride."

Quite a ride, indeed. On the bright side, many companies that embark on a merger or acquisition are finding — like Au Bon Pain — that a distributed client/server architecture can expedite things enormously. Client/server's modular design promises that additional IS capacity can be added incrementally as needed; that new or different clients can be connected without major architectural redesign; and that disparities between vendor and platform choices are not serious roadblocks to seamless integration of formerly separate data stores.

Easier said, however, than done. For starters, many "open" client/server applications lack the integration tools or interfaces to connect with other "open" environments. Even when such interfaces exist, the

Please turn to page 22

BY ALICE LAPLANTE



One's in St. Louis and one's in Boston, but St. Louis Bread's Billy Klearman and Au Bon Pain's Mark Factor have kneaded a successful IS strategy that leverages client/server technology for both bakery/cafes

Continued from page 20

task of acquiring and installing the necessary hooks that connect each type of client to each server used within the enterprise can be daunting (see story page 23).

And if organizations are to succeed, there's still the job of "massaging" and formatting data so it can be passed seamlessly from one application to another. And because few, if any, companies have achieved a pure client/server implementation of all corporate systems, chances are high that two companies about to become one will face the same old challenge of making older, proprietary technologies and data stores work with newer client/server systems.

"You need highly skilled and dedicated people who can pull off an enormous amount of planning, research and seat-of-the-pants decision-making while under a tremendous amount of time pressure," said Ted Bailey, project manager in the new technologies group at Shaker Heights, Ohio-based OfficeMax, Inc., which has successfully integrat-

tions are primarily done for synergistic reasons: to complement existing products or services or to broaden geographic market coverage. Far from dismantling their acquisitions' operations or staffs, today's corporate buyers tend to pump additional money and expertise into the acquired companies, hoping to fan the flames of an already successful operation even brighter.

Given the increasing importance of information processing as a strategic tool for survival in virtually all industries, "Understanding the technologies involved when evaluating new business opportunities is absolutely critical," said Jonathan Pavloff, vice president of corporate planning at Roadway Services, Inc., a Fortune 500 trucking conglomerate based in Akron, Ohio, that has acquired half a dozen operating companies in the past five years.

And client/server brings its own unique issues to the negotiation table. For starters, companies can no longer expect the "easy" cost savings that result from closing redundant

But that's a small price to pay for the tremendous leverage that enhanced access to business data gives St. Louis store managers, Factor said.

ON THE ROAD AGAIN

Roadway's corporate growth strategy is to expand and supplement existing shipping and courier services throughout North America with the acquisition of operating companies in key markets.

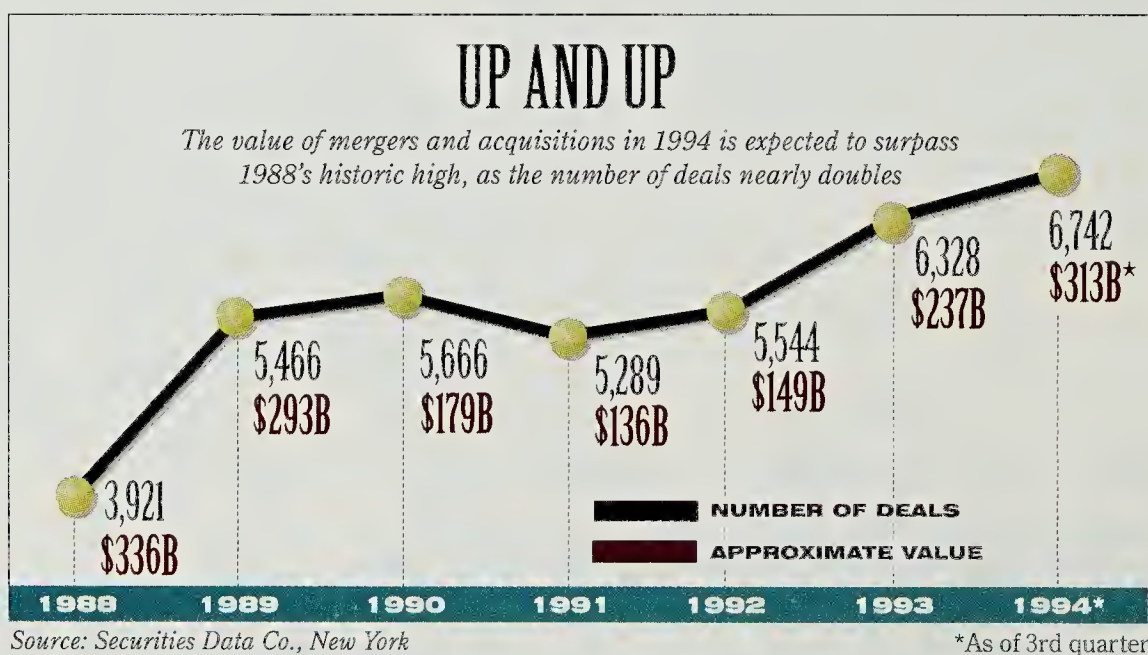
And like Au Bon Pain, Roadway is adamant about keeping the existing management of its acquisitions intact. "We only buy strong companies, so we don't feel the need to do a lot of restructuring," said Gerald Long, president of Roadway Information Systems, Inc., the IS subsidiary of Roadway. Long said this generally goes for IS operations as well. But it's Roadway IS's commitment to open systems and client/server that makes this hands-off philosophy possible, he said.

Roadway IS has historically provided the links to allow for enterprise-wide reporting of financial data between the subsidiaries and parent company; more recently, Roadway IS has been acting as the hub of an effort to define clear corporate standards to allow Roadway companies to more readily share critical data.

Roadway IS's architecture centers around IBM RS/6000 machines located at more than 600 Roadway sites across the country that share processing duties with the IBM 3090 mainframe in Akron. PC clients and LANs are also attached to the RS/6000 workstations at the local processing hubs.

As Long's staff continues to build applications to layer on top of this distributed architecture, Long needs to ensure that newly acquired subsidiaries can tap into the system without undue pain.

Thus, Roadway has developed what Long calls an "alliance of strong CIOs" — chief information officers from each Roadway company who meet quarterly and are setting standards for an open and distributed ar-



ed the operations of four acquired companies in the past three years.

Not since 1988 has Wall Street seen such a frenzy of mergers and acquisitions (see chart). But forget Michael Milken- and Ivan Boesky-type corporate bloodbaths, which resulted in immediate liquidation of acquired assets.

Today's mergers and acquisi-

data centers and unplugging extra host systems. And support costs are likely to go up, not down, with a distributed architecture, analysts said.

"You certainly don't get any cost reductions from moving to client/server," said Mark Factor, vice president of IS at Au Bon Pain. "If anything, your support and application development costs will increase."

chitecture they can all live with.

Analysts say this strategy is working well for the growing transportation conglomerate. "Roadway has one of the most effective management structures in the regional [less-than-truckload] segment of the trucking business," said Otto Grote, a trucking analyst at Derby Securities in New York.

In contrast, OfficeMax has chosen a different strategy. Rather than allow acquired companies' information systems to coexist, the company guts old technologies and builds a mirror-image infrastructure.

For instance, when the company acquired BizMart, Inc. and Office Warehouse, Inc., the chains disappeared: They became OfficeMax, down to the bowels of their information systems. This meant extending to every acquired outlet the vast client/server network that OfficeMax first installed in 1992 while it was still controlled by Kmart Corp.

A Unisys Corp. 6000 Model 85 operates as the chain's main production CPU; Unisys 6000 Model 65 serv-

ers are installed in every store to perform local processing and run departmental applications.

The strategy appears to be succeeding. Sales in fiscal 1993 reached \$1.42 billion, up 169.3% from the previous year. More than 100 new stores were opened, mostly through the new acquisitions. Between 60 and 70 new store openings are planned for the next two years.

"We couldn't accommodate the tremendous growth" without moving to client/server, OfficeMax's Bailey said.

Others on the mergers and acquisitions strategy route agree.

"The leverage we could get from giving St. Louis immediate access to our corporate back-office functions, such as payroll and accounting, was one of the obvious synergies that drove the deal forward," Au Bon Pain's Factor said. "This wouldn't



Gerald Long is behind Roadway's open systems commitment

have been possible without a client/server architecture."

Meanwhile, store manager Karel couldn't be happier. He can sit down at his store's PC and know his latest profit and loss results within seconds.

"This puts me in the driver's seat," he said. ■

LaPlante is a freelance writer based in Woodside, Calif.

THOUGHTFUL INTEGRATION

When BankAmerica Corp. embarks on a merger or acquisition, the resulting systems architecture is a hybrid that reflects careful consolidation of formerly separate IS universes. What makes this possible is adherence to a three-tiered client/server strategy that buffers the \$11.6 billion bank holding company from having to redesign its architecture with each new acquisition (see story page 55).

San Francisco-based Bank of America has had two high-profile mergers and acquisitions in the past three years: In April 1992, the bank completed a merger with Los Angeles-based Security Pacific Corp., and on Sept. 1, 1994, it announced completion of the acquisition of Continental Bank Corp. in Chicago.

The technology consolidation of the Continental Bank acquisition has just begun. But Margie Farber, senior vice president of retail deposits and branch automation, said Bank of America learned valuable lessons from its Security Pacific experience.

Farber helped oversee the melding of the two companies' retail systems groups, which was completed in April 1993.

Precisely because Bank of America was so much further along with a distributed client/server strategy, its overall retail architecture prevailed. And it was that architecture — built using a

three-tiered model that separated client interfaces and front-end applications from back-end data stores by a middle communications layer — that let Bank of America salvage a great deal of innovative applications already in use at Security Pacific. The buffer that the middle network layer provided helped the bank "expand our volume and capacity immediately without having to redesign the overall architecture," Farber said. "We thus incorporated the acquisition much faster than we could have otherwise."

Interestingly, it wasn't always the technical or functional excellence of a particular application or system that decided whether it would stay or go. Sometimes, Farber said, the ease of integration of a particular technology into the existing architecture carried more weight.

She also cautioned that a distributed architecture doesn't solve all your problems during a consolidation. There are the connections that don't connect, the open systems that aren't open and the fact that "so many critical components of client/server computing are still emerging," she added.

Farber has lately been forming a special IS group that will work on harnessing the power of the distributed systems made possible by the mergers. "Now that we have an efficient architecture model, it's time to look at all the creative LAN and client/server technologies that exist throughout the combined enterprise and see how we can more effectively manage those resources," she said.



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Outnumbered and overburdened

Michael Huiatt remembers how careful he was to select the right client/server vendor for accounting software. And how he nearly came to grief anyway.

It was three years ago, just as his company — 1,000-employee Tesoro Petroleum Corp. in San Antonio — was looking for a better way to integrate the financial results from its 35 subsidiary companies.

Huiatt, Tesoro's manager of financial systems administration, decided to buy from Platinum Software Corp., an Irvine, Calif., firm that was new to the client/server market but had good software and a favorable track record.

But what Huiatt didn't know was that Platinum had incorrectly recorded \$18 million in revenue. It later had to restate that revenue, and by early last year, several top Platinum executives had resigned as the company braced itself for an investigation by the U.S. Securities and Exchange Commission.

The company's new management later admitted that Platinum

OUTGUNNED IS SEEKS WAYS TO MANAGE CLIENT/SERVER'S UPSTARTS, UNKNOWNNS

had been teetering on the brink of a Chapter 11 bankruptcy filing.

Huiatt was lucky. Under new management, Platinum remained in business. But Huiatt's

experience points out the difficulty of choosing client/server vendors when few are well known or have lengthy track records.

"There was no way to know at that time that Platinum was bad," recalled Christine Obrycki-Ebken, a senior manager at KPMG Peat Marwick in Pittsburgh who served as a consultant to another Platinum customer, Calgon Corp. in Pittsburgh.

Given the risk of doing business with combinations of companies that aren't household names, what's an information systems executive to do?

There's more than one answer. Nearly everyone in IS favors asking a lot of hard questions about products, references and customer support, although that sometimes means hiring consultants to help (see box page 27). Many client/server customers are too new to the field to make good buying decisions; in other cases, corpo-

Please turn to next page



BY STEVE ALEXANDER

Continued from page 25

rate downsizing has hit IS shops so hard that they lack the in-house expertise to evaluate client/server vendors.

Paul Cubbage, Dataquest, Inc.'s director of client/server software in San Jose, Calif., said employment cutbacks have reduced the ability of IS departments to evaluate new client/server applications software. "If you've been cut back enough, you're probably looking for a consulting outfit to come in and do it," he said.

New York-based D'Arcy Masius Benton & Bowles (DMB&B), the nation's ninth largest advertising agency, used consultants on its first client/server effort. "We didn't want to go into client/server to fail," said Karen Lesko, account manager for DMB&B's client/server group in Bloomfield Hills, Mich. "We had to find somebody to tell us what to do."

LOOK BEFORE YOU LEAP

Whether you use consultants or not, there's no substitute for doing your homework before you buy.

"Your best protection is the due diligence you do up front because once you decide to bring a client/server product into your fold, you're a partner with that other company, whether you want to be or not," said Roger Goss, director of IS for The Carolina Panthers, a National Football League expansion team based in Charlotte, N.C.

"Check a vendor's references and financial background, and check the vendor's credit history with selected suppliers the vendor buys from," he added.

Some IS executives favor contingency agreements to protect themselves. One method is to place the vendor's source code in escrow so that if the vendor goes out of business, the customer has something to fall back on. Another technique is to withhold about 20% of the purchase price of a client/server product until the vendor's performance has been assessed.

However, Cubbage said having

VENDOR CHOICE

Chad Skidmore, IS director at Zak Design, Inc. in Spokane, Wash., said that after much evaluation, he chose an established accounting software company, Great Plains Software in Fargo, N.D.

He picked it even though at the time, Great Plains had been in the client/server market for less than a year.

"Some of the guys turning out the best products are the ones who have been producing software for only the last year. They just happened to pull the right talent together," Skidmore said.

Zak Design's size played a role in Skidmore's selection of Great Plains. The company has about 100 employees and anticipates 1994 sales of \$25 million. Zak Design produces, under license from movie studios, children's plates, bowls and cups imprinted with cartoon characters, such as those from The Lion King or Looney Tunes.

"We are larger than Great Plains' typical customer, and we thought by that fact alone we probably would get more attention from them as a vendor," Skidmore said.

However, Skidmore cautions others not to buy from a vendor just because it has had success in non-client/server fields. "I would say success in other fields doesn't guarantee success in client/server. In some cases, it is probably a hindrance to have a development staff accustomed to developing DOS-based accounting solutions that has been thrown into client/server. That's a lot to thrust onto a software development team and expect them to do it right the first time."



Zak Design's Chad Skidmore says a vendor's 'success in other fields doesn't guarantee success in client/server'

source code in escrow may be no protection at all. "The environment is changing so fast that in a year or two, the source code won't do you any good," he said.

PAYMENT HOLDBACKS

Zach Shoher, president of 6 Sigma Group, Inc., an Austin, Texas, systems integrator that is building a client/server financial system for Motorola, Inc., is a believer in withholding money from client/server vendors. "With smaller vendors, I've withheld more than 20% of the payment to the end of the project. Holding the payment 90 days is long enough to know if they're responsive."

Calgon, a 1,200-employee manu-

facturer of chemicals used by municipal water treatment plants, withheld money from one of Platinum's business units after the unit was sold to another company. Bob Shaffer, senior technical associate at Calgon's IS division, said the payment was withheld because of unsatisfactory modifications made to the Platinum accounts payable software.

The project still hasn't been satisfactorily completed, and Calgon still hasn't paid the balance of the money, he said.

"There's no set amount of time we will hold the money. We'll hold it until we are satisfied," Shaffer said. "Our contract doesn't say that, but I think we've got good ground to stand on if they challenge it."

However, it isn't always practical to withhold money, according to Goss. "It depends on the nature of the project and its size. If it takes months or years, hold back money. But if you buy a package with a relatively short installation time, it's not practical to withhold money. It becomes an administrative nightmare for you as well as for the other company."

Dataquest's Cubbage said delaying part of the payment may be counterproductive. "If you hold a vendor's

look at little mom-and-pop shops."

Skepticism about little companies makes life hard for vendors such as Paralon Technologies, Inc., a nearly 3-year-old, 14-employee data security firm in Bellevue, Wash. Since early last year, Paralon has manufactured a hardware device that determines whether two computers are authorized to communicate and, if so, encrypts their data exchange.

But company executives, fearing they weren't getting orders because their company was new and small, began offering a 30-day, money-back guarantee. They believe it's bringing them business, and so far, it has resulted in only one product being returned.

RISKY BUSINESS

Despite the risks of using small, new client/server vendors, many IS customers will do it anyway, Cubbage predicted. "If you want to do something advanced in client/server for strategic reasons, then you have to take a risk to beat the competition," he said.

DMB&B's Lesko suggested using clusters

of criteria to evaluate small, new client/server vendors.

For instance, a two-employee software company that's been in business five years and has 500 clients might be more attractive than a 100-employee company that's been in business two years and has 20 clients, she said.

But despite all the criteria available for picking vendors, it sometimes comes down to just exercising good judgment.

"It's not scientific," Lesko said. "It's a warm and fuzzy feeling you get from a vendor—a question of whether this one feels all right to you." ■

Alexander is a Minneapolis-based journalist who reports on technology.



Calgon's Bob Schaffer is withholding money from a Platinum business unit until his accounts payable software is running satisfactorily

feet to the fire enough, you may just kill the vendor off. You have to ask yourself what you can do to make your vendors successful because they need you, and you need them."

AVOIDANCE THEORY

Perhaps the most cynical approach among some IS executives is to completely avoid small, little-known client/server vendors.

Other IS executives say they start with big, established vendors for their initial client/server purchases, then branch out to smaller, untested vendors.

"We avoided some little companies initially," said Mike Stegeman, client/server system architect at DMB&B. "Now we are starting to



TOUGH TALK

The following is a list of hard questions to ask your prospective client/server vendor from D'Arcy Masius Benton & Bowles, a large New York-based advertising agency.

1. How many years have you been in business?

2. How many employees do you have?

3. Where are your sales offices and engineering support offices located?

4. What major affiliations or partnerships do you have with other vendors, such as IBM or Microsoft?

5. What was the date of the first release of your current product?

6. How many total installations and total sites do you have for the product?

7. What hard-copy and on-line manuals are provided for each of your products?

8. For what period of time are major and minor product upgrades included in the purchase price of the product?

9. How many technical support people do you have during normal business hours and how many at other times?

10. What is the average waiting time for a caller to speak with your technical support people or to receive a call back?

11. Are your support engineers available for on-site consulting?

12. If you use third-party support, what are the names of the companies nearest our corporate locations?

13. Is support provided through an on-line bulletin board system?

14. What is the cost of vendor-provided training, and how often is it available?

15. Who are the local or national user groups for your product, and which three current users can provide references?

When Charles Schwab & Co. began moving from mainframe-centric to distributed client/server computing in 1992, it threw tens of millions of dollars and more than 200 people into the effort. At the project's heart was one key technology: the Open Software Foundation's (OSF) Distributed Computing Environment (DCE), which promises enterprisewide coordination among mixed computing platforms.

Schwab's premise: Create a mixed computer environment to host distributed applications and save tens of millions of dollars, starting in 1996. The applications were to be layered on top of various operating systems and a layer of DCE middleware that provides data, navigation and synchronization services to networked computers.

But the San Francisco discount brokerage's push toward

distributed computing soon hit a brick wall. Development efforts were hampered by a lack of off-the-shelf tool kits and an unexpectedly steep learning curve for several dozen people directly involved in DCE deployment and 150 programmers trained in Cobol who were writing client/server applications with computer-aided software engineering tools.

Moreover, the complexity of the prototyped DCE code "just collapsed of its own weight," in the words of one Schwab executive.

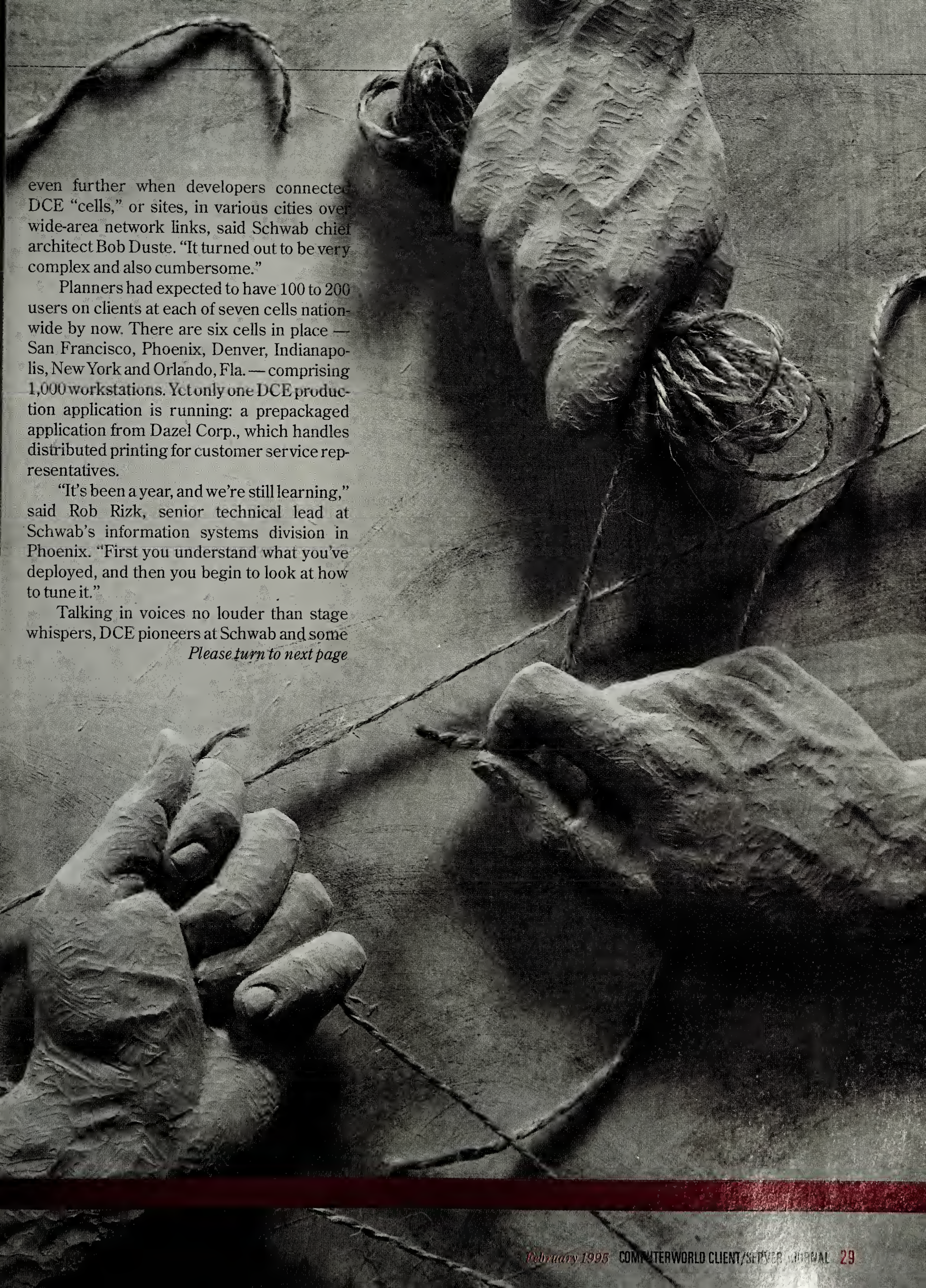
In addition, concerns arose over whether the pilot environment could be "scaled up" to handle the brokerage's millions of daily transactions. Data access slowed to a crawl because of slower-than-expected remote procedure calls (RPC) between clients and servers as well as each application's need to interact with various DCE services.

Performance deteriorated

**AMBITIOUS IN
ITS DESIGN, THE
DISTRIBUTED
COMPUTING
ENVIRONMENT
IS FAR FROM
COMPLETION**

CAN DCE DELIVER?

BY JEAN S. BOZMAN



even further when developers connected DCE "cells," or sites, in various cities over wide-area network links, said Schwab chief architect Bob Duste. "It turned out to be very complex and also cumbersome."

Planners had expected to have 100 to 200 users on clients at each of seven cells nationwide by now. There are six cells in place — San Francisco, Phoenix, Denver, Indianapolis, New York and Orlando, Fla. — comprising 1,000 workstations. Yet only one DCE production application is running: a prepackaged application from Dazel Corp., which handles distributed printing for customer service representatives.

"It's been a year, and we're still learning," said Rob Rizk, senior technical lead at Schwab's information systems division in Phoenix. "First you understand what you've deployed, and then you begin to look at how to tune it."

Talking in voices no louder than stage whispers, DCE pioneers at Schwab and some

Please turn to next page

Continued from page 29

other large corporations are saying that the OSF's plan for an all-inclusive middleware infrastructure was probably too grand, even from the start.

The upshot: Many users are staying on the sidelines, waiting for newer, faster and easier-to-use DCE features to be shipped and for standards to coalesce. Some are rolling their own distributed computing architectures, without DCE.

Others look at DCE as a good beginning. It's a template for building next-generation distributed systems, which may encompass distributed objects and asynchronous message-passing to improve performance.

But Schwab and other large organizations, which had thought they'd be further along the distributed computing curve by now, are cautiously moving ahead with DCE. A wave of applications is expected to be put into production this year at companies that for years have spent millions of dollars piloting the technol-

ogy (see box page 31).

The long adoption curve is painfully necessary, according to DCE vendors such as Digital Equipment Corp., IBM and Hewlett-Packard Co., because distributed applications, for the most part, still need to be built from the ground up.

"Initially, a number of customers were waiting to see how the market would adopt DCE," said Sumner Blount, DCE product manager for Digital's enterprise objects software group in Littleton, Mass. "That took a year or two of waiting around. But I think it's fair to say that DCE has won the battle, given the fact that it is endorsed by virtually every major vendor." That includes Microsoft Corp., which co-developed the Common Object Model technology based on DCE RPCs with Digital.

Some observers said they believe the pace of DCE adoption is just about right, given DCE's status as a building-block technology for a brave, new distributed infrastructure

for the late 1990s (see story below).

"You don't invest in a whole new infrastructure to do a 10-month project," said Judith Hurwitz, president of Hurwitz Consulting Group in Waretown, Mass. "You do it because you want to have something in place for the next 15 years." She said it may take up to five years before DCE technology becomes widely deployed.

Not everyone agrees. Jim Johnson, chairman of The Standish Group International, Inc., a consultancy in Dennis, Mass., said he believes DCE is doomed. "All my data points to date have shown DCE is not going to take off," he said.

For example, Standish Group's June 1994 survey of 4,000 users from 1,000 companies found that 77% "never" plan to use DCE. Of the remaining 21%, less than 1% said they are definitely planning to use DCE, while 1.5% said they are "probably" going to use it. More than 14% said they are "probably not" moving to DCE.

Standish Group did not provide

DCE IN THEORY

In theory, DCE is an ideal solution to a complex problem. Most large user organizations already have dozens to hundreds of computers in a mixed-vendor environment. As computers are linked to an enterprisewide backbone network, the differences between operating systems and file systems are accentuated, which prevents free and easy data exchange. Often, the only practical solution is to use a database-to-database gateway, where the end user is aware of navigating to the target system.

With DCE, the middleware automatically handles navigation between clients and the networked servers: The user does not need any direct knowledge of the network layout. If one server does not provide the answer to a given query, another is automatically tried.

The key to DCE's promise is that the nature of the operating system and hardware for both clients and servers is transparent to DCE applications. A wide variety of platforms, including IBM MVS mainframes, Digital VMS minicomputers, Unix servers and IBM PC clients, is supported. However, there are key gaps in that support. For example, Macintoshes are not yet supported as either DCE clients or servers.

DCE's architecture relies on a cell structure, in which a community of networked computers is defined by a cell directory ser-

vice (CDS) that names all cell files and authenticated user IDs. DCE directories also hold the navigational information needed for users to access scattered servers throughout the network. Multiple DCE cells are linked by the Internet or by a WAN connection using an X.500 "global" directory.

The basic mechanism for accessing DCE's networked services is an RPC. DCE services include the CDS, the distributed file service, the global directory service, the security service and the timing service, which is used for synchronization. Applications developers can access these core services by writing their programs to DCE's APIs. They may also write to DCE's "threads," which break application tasks into smaller tasks.

However, the transition to objects may be a bumpy one. DCE is based on procedural code and must be adapted to work with object-oriented application development frameworks and with distributed object request brokers. Also, objects tend to be used for message-passing or event-driven applications, such as stock quote updates.

But there are hopeful signs of progress toward moving DCE into objects: HP already supplies an object-oriented tool kit called OODCE, but users said more such tool kits are needed. And many DCE sites routinely write C++ object-oriented application code.

data on the size of the companies surveyed, a key consideration because it's primarily large companies that are attempting to build DCE applications. Nonetheless, there was one prevalent user sentiment detected: DCE, as currently constituted, is difficult to deploy and use.

"People go into it with the idea that they'll be able to install and plug and play without a lot of staff, and they're not aware that they need to have the same kind of systems programmers they had working on the mainframe," Johnson said.

Those obstacles were clearly encountered by Schwab and are echoed by many other early adopters, no matter how committed they are to installing DCE. The technology's shortcomings, according to more than a dozen users and analysts, include the following:

- A relatively small array of DCE tool kits when development began in 1992. Without such tool kits, users had to deal directly with DCE's 400-plus system calls — a cumbersome programming experience, by many accounts. To invoke DCE services, programmers must write to specific application programming interfaces (API). This year, however, the number of DCE tool kits grew, and some vendors added ease-of-use features allowing first-time users to build on scripted code.

- A wide learning curve for programmers, who must learn to handle multithreaded applications in which small sections of a task are separated to run on different processors. Multiple processes must communicate with one another to pass data.

- A lack of performance-tuning tools and management consoles for DCE cell environments. Several vendors are reportedly working on a DCE management console that monitors the availability of DCE services and applications. Other vendors could then link that "logical" view of DCE cells and available applications to existing network management frameworks such as IBM's NetView 6000 and HP's OpenView and to systems

DESTINED FOR DCE?

*The following organizations
are moving cautiously
ahead with DCE:*

THE U.S. NAVAL SPACE COMMAND in Dahlgren, Va., uses DCE applications to track some 8,000 space objects. The DCE cell already deployed supports 250 concurrent users. Computation time on the DCE cell's clustered IBM RS/6000s is up to six times faster than it was on mainframes and mini-computers.

MEAD DATA CENTRAL in Dayton, Ohio, has already deployed one DCE application to monitor its data center Unix servers. It plans to deploy another application to help users navigate through its mission-critical, on-line data services.

US WEST in Denver is building a database query application that will allow some of its largest corporate customers to check on problems with phone lines by mid-1995 (see story page 32).

WELLS FARGO BANK NA in San Francisco is waiting for vendor-supported DCE 1.1 before putting a customer-profile lookup application into production at bank branches throughout California.

THE BOEING CO. and **CITICORP** are piloting DCE applications.

management consoles, such as those from Tivoli Systems, Inc.

"I am appalled that IBM, HP and Digital, which are investing heavily in network management, have yet to show up with a product for managing and administering DCE cells," said Ken Hobday, who recently left Mead Data Central, an information services provider in Dayton, Ohio, where he was distributed services architect at the company.

The OSF's inability to deliver an environment to manage distributed applications has also left a bad taste in some people's mouths.

"This kind of puts a cloud over the whole DCE/OSF future, from my perspective," said Jerry Johnson, a senior policy analyst for the state of Texas in Austin who monitors several open standards efforts for 250 state agencies.

And there are other DCE constraints that vendors do not want to discuss. DCE's cell directory service, for instance, proved too complex to handle enterprise-level transaction loads in many cases, said Frank Dzubeck, chief executive officer of Communications Network Architects, Inc., a Washington consultancy. "The cell directory concept has limitations in terms of scalability," he said. "It will not work in very large enterprises."

Another sticking point for users: vendor slowness to adopt the latest DCE code release.

For example, DCE 1.1 was announced last fall but will not be included in many systems vendors' products until mid-1995. The advantages of using DCE 1.1 include better systems administration and new auditing features for security. But the wait for vendor implementation just accentuates other delays in users' evaluations of DCE. Each vendor packages DCE features in its own product set, and each DCE release must be tested for reliability before shipment.

The OSF is re-engineering itself to speed up deliveries. OSF engineers used to develop the DCE base code, and they did not deliver it to sponsors until the entire release was completed. From now on, DCE and other OSF technologies will be developed — and shipped — by small working teams of vendors that sponsor the OSF. Key technologies should arrive faster because they will not have to wait to be rolled up in a new build, observers said.

Fed up with waiting, however,
Please turn to next page

Continued from page 31

many large companies plan to develop their own architectural backbones and to plug in various pieces of distributed technology, including DCE. Until standards for distributed computing emerge, users will have to fill the role of systems integrator. "We anticipate seeing some of the solutions appear in the 1995 time frame, but we really don't see things being resolved on a wide scale until 1997," said the state of Texas' Johnson.

There are, indeed, many ways to get distributed computing done — options that are only too clear to users in large organizations. Some have chosen to pursue DCE in one business unit, only to standardize on relational databases in multiple locations as distributed computing workhorses. Others have adopted networking standards such as TCP/IP to link all computers in an enterprise. Still others are using Sun Microsystems, Inc.'s ONC/NIS+ directory and file services for distributed computing in Sun networks.

"The goal is to get everyone headed in a common direction," said John Keane, chief of the migration systems division at the Defense Information Systems Agency in Reston, Va. "You may not get the standards that the religious zealots wanted. Quite often, an alternative solution wins in the marketplace, but the goal is achieved."

While DCE standards percolate, certain pioneers remain upbeat.

British Columbia Hydro and Power Authority's network computing services division in Vancouver, British Columbia, is actively developing a DCE database query application for managing inventory of field workers' equipment and clothing. Multiple computer clients will be able to access data on field equipment from a relational database on a Microsoft Corp. Windows NT server.

Programmers use Microsoft's Visual Basic to design query screens, and all clients are Microsoft compatible — so far. But DCE technology could be extended over time to in-

DCE ON-LINE

US West Communications, Inc. in Denver is among those pioneers that have traveled furthest down the DCE path. The telecommunications firm plans to gain competitive advantage from a DCE application that allows long-distance telephone companies to access on-line databases for data about line outages.

This "trouble ticket" application, similar to ones that now run on US West's mainframes, is being transferred to about 10 Hewlett-Packard HP 9000 Unix servers this calendar quarter. For the first time, some of US West's clients will be able to tap into the company's operational data directly. The system is called Mediacc, for mediated access. HP, one of DCE's biggest supporters, worked with US West for two years on the project.

"We'll give external customers access to controlled data within our network," said Michael Ondrejko, a development manager at US West. The Sybase, Inc. relational database on the HP servers is continually updated by mainframe transaction systems. So if a major trunk line fails, users of the DCE client application will access US West's operational database and see the outage reflected on-line.

Chief among the benefits is increased operational flexibility for US West. The application will provide near fault tolerance because users will access the data even if one HP server goes off-line. "You don't even have to know what node the process is running on," Ondrejko said.

One of the main lessons US West learned, however, was that programmers had to adapt to working with multithreaded DCE applications. "As we put everything together, a lot more issues came up in terms of implementation," Ondrejko said. "We didn't have just one executable — there's a half-dozen to a dozen different processes trying to talk to one another. When they were tested in isolation, a lot of the problems didn't show up."

clude the company's mainframes and Unix servers, said Dave Corris, a senior systems analyst at the utility. However, BC Hydro is bent on proving the concept first and is not rushing into production. "This pilot project is very small; it's very contained. It's just to get our feet wet," he explained.

Wary Schwab, which has done well with client/server LAN applications, is still installing DCE software but for a limited set of applications and at a reduced pace. "We're going to do it based on experience rather than theory," Schwab's Duste said.

Schwab's second DCE-compatible application, a version of a current Quotron stock quote application, is expected to go on-line this year. But other, homegrown DCE applications are still in the development and testing stages, Schwab officials said.

Other companies are waiting to see how DCE will be adapted for object-oriented computing, which is expected to be the next level of distributed computing, before they decide whether to hop on the bandwagon.

However, DCE recently lost an important round in the object standards wars when the Object Management Group bypassed DCE's RPCs as the sole technical basis for its Common Object Request Broker Architecture 2.0. A rival proposal — backed by Sun, Bell Northern Research and others — to use TCP/IP as the basic network transport was chosen instead. It made DCE an option.

Despite the setback, DCE marches on. At the very least, DCE will live on as a matched set of integrated network services on which vendors will build, Communications Network Architects' Dzubeck said. "Each of the networking services that are part of DCE are the legacy that's going to be used as part of the implementation architectures for corporations," he concluded. ▀

Bozman is a Computerworld senior editor, Open Systems, in the Burlingame, Calif., bureau.

How Are We Doing?

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Please take a few minutes to answer the following questions and fax this sheet back to **Editor Alan Alper**. Thank you.

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Adobe Systems, Inc.'s Acrobat

Never mind cost savings. Sometimes a good document management system just keeps you out of trouble.

Take Northrop Grumman Corp.'s Commercial Aircraft Division, for instance. After the division's Hawthorne, Calif., center installed an Interleaf, Inc. document management system last summer, Joyce Stratton saw vast improvements over the paper method of reviewing and publishing the company's huge policy and procedure manuals.

The \$175,000 system (including hardware, software and training) enabled the center to cut its document review cycle from six months to 10 weeks and reduced staff require-

Managing documents is a classic problem that the advent of word processing (and the resulting document flood) simply amplified.

ments from 12 employees to three, thereby paying for itself, said Stratton, who manages policies and procedure administration.

But more importantly, the center's 400 professionals no longer have to manually update sections of their policy manuals whenever a change is made. Rather, they use Interleaf client software called WorldView to look at up-to-the-minute electronic manuals stored on servers.

"Now when an auditor comes in, people don't say, 'Oh my God, I forgot to file the last 50 versions [of a policy manual]' and get written up," Stratton said, adding that staffers were caught with outdated policy and procedure

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BY LYNDIA RADOSEVICH

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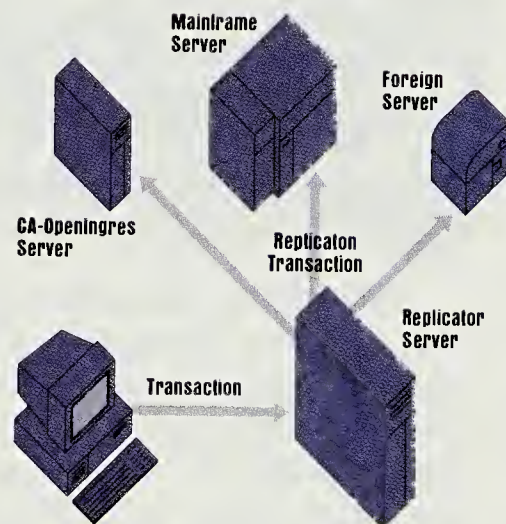
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Continued from page 33

manuals nearly every time an auditor visited.

Managing documents is a classic problem that the advent of word processing (and the resulting document flood) simply amplified. So companies such as Northrop Grumman are increasingly turning to client/server technologies to help organize and improve access to corporate information stored in documents. Their business goals: more productive workers, products that hit the market faster and indirect cost savings.

**Users warn that failure
to first improve the
business processes can
lead to unexpected delays
and diminished
returns.**

around specific business processes, these tend to be complex, turnkey applications from vendors such as Interleaf and Documentum, Inc.

The second category comprises ad hoc systems used for more general, office administrative procedures. These are built around systems from the likes of PC Docs, Inc., Saros Corp. and Novell, Inc.'s SoftSolutions.

Big Six accounting and consulting firm KPMG Peat Marwick is an example of an ad hoc user. Rather than automating a specific process, KPMG is building a companywide

WorldView Press compresses all documents and builds in hyperlinks.

The user creates multisource documents using word processors, graphics programs and other applications.

Users can print the compound document collection or view it on-line or from CD-ROM via the WorldView viewer.

Interleaf, Inc.'s WorldView

"People are starting to realize that corporate information in document form is as important as corporate information in data form," said Linda Myers-Tierney, an analyst at International Data Corp. in Framingham, Mass.

Typically, client/server document management systems let users check electronic documents and images in and out of a server-based repository or "library," track document versions and conduct full-text searches and retrievals using multiple desktop and server platforms. Document-level security allows managers to control who sees what and enables them to manage files created outside of the document management system, while workflow technology enables automatic routing.

Document authoring software either is integrated into the systems

or is part of the standard desktop software. Technologies such as Microsoft Corp.'s Object Linking and Embedding and Component Integration Laboratories' OpenDoc let users create documents comprising reusable objects that were created in diverse applications. Viewing software, such as WorldView and Adobe Systems, Inc.'s Acrobat, lets users see formatted documents even if they don't have the originating application.

User needs break down roughly into two categories, which largely dictate the type of document management system users purchase, said Jamie Popkin, an analyst at Gartner Group, Inc. in Stamford, Conn. First are line-of-business applications, such as Northrop Grumman's. Built

system that focuses on managing PC application output.

At the desktop level, KPMG professionals create compound documents using Microsoft programs. The documents are uploaded to Novell NetWare servers. FirstClass, a groupware package from SoftArc, Inc., serves as a front end and lets other KPMG professionals access whole reports or pieces to incorporate into their own management proposals.

KPMG chose to build its own system rather than buy a turnkey system in order to keep the end users' desktops the same. Also, the firm wants to remain flexible enough to migrate to Microsoft's upcoming Exchange messaging and groupware server if it meets expectations, said Chief Information Officer Tony Ottavio.

"I can leverage the fact that we're

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- 65. Communications Systems/
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President/ Asst. VP IS/MIS/DP
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- 21. Dir./Mgr. MIS Services, Information
Center
- 22. Dir./Mgr. Network Sys, Data/Tele.
Comm., LAN Mgr./PC Mgr.,
Tech Planning, Admin. Svs.

- 23. Dir./Mgr. Sys. Development,
Sys. Architecture
- 31. Programming Management,
Software Developers
- 41. Engineering, Scientific,
R&D, Tech. Mgt.
- 60. Sys. Integrators/VARs/
Consulting Mgt.

CORPORATE MANAGEMENT

- 11. President, Owner/Partner,
General Mgr.
- 12. Vice President, Asst. VP
- 13. Treasurer, Controller,
Financial Officer

DEPARTMENTAL MANAGEMENT

- 51. Sales & Mktg. Management
- 70. Medical, Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT

- 80. Information Centers/Libraries,
Educators, Journalists, Students
- 90. Other Titled Personnel

3. Do you use, evaluate, specify, recom- mend, purchase: (Circle all that apply)

Operating Systems

- | | |
|-------------|----------------|
| (a) Solaris | (e) Mac OS |
| (b) Netware | (f) Windows NT |
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| (d) Unix | (h) NeXTstep |

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The Newspaper of Information Systems Management
September 5, 1994, Vol. 28, No. 36, 146 Pages, \$6/Copy, \$48/Year

COMPUTERWORLD

Object standards accelerate

Microsoft blesses emerging standard IBM pulls mainframe into new development role

By Michael Caroli
The Irish Republican Army was not the only group offering an olive branch in Europe last week. To the relief of many corporate developers, Microsoft Corp. officially ended the war of words with the industry's major object standards group. The desktop behemoth is now taking part in the standards process. At an Object Management Group meeting in Dublin, Microsoft threw its weight behind an emerging specification that would allow its Common Object Model to interoperate with the OMG's Common Object Request Broker Architecture. COM is the object model behind Microsoft's Object Linking and Embedding, so the specification would allow OLE and CORBA to interoperate. The move affords hope to beleaguered programmers who have been facing the unpleasant task of implementing different object models on different platforms. Until last week, Microsoft said it would rely on other vendors.

Microsoft, page 14

By Ed Sennett
In early October, IBM will roll out several object-based tools designed to finally and fully involve the mainframe in corporate client/server development. The computer giant will announce versions of C++ and SOM, object-oriented Smalltalk and an object-oriented version of Cobol for its MVS mainframe operating system, according to sources briefed by IBM. The company will also announce its new class libraries, called the Application Class Library Services. The announcement is tentatively scheduled for Oct. 4. Final versions of these tools are expected to be available at varying dates from mid to late 1995. Among the select few corporate information systems shops that have examined early versions of the products, most believe they give IBM the best chance yet of realizing its deferred dream of cross-platform application development.

IBM, page 14

Success strains SAP Support

By Rosemary Calosio
ORLANDO, FLA.
After 20 years of chugging alongside other conservative mainframe software vendors, SAP AG is suddenly facing the fast-paced world of success in the client/server market. Its most pressing note so far is dealing with a shortage of consulting expertise. The German company is emerging as a dominant force against competitors such as Oracle Corp. SAP has built a worldwide customer base of 1,900 for its 2-year-old R/3 client/server suite of integrated applications. Its Suppliers International '94 user conference here last week drew 4,000 attendees. Also last week, SAP announced that Pacific Gas & Electric Co. in San Francisco had signed an \$8 million contract for R/3. "Partly what we were looking for was a client/server business system as opposed to just an accounting system," said Tom Long, controller at PG&E. "We were looking for that integration, and we wanted it all tied together." SAP met that criteria. At Foster Corp., a pharmaceutical company in Carrollton, Texas, CEO Robert Brown said, "We are building our company on this." Foster plans to replace a mix of legacy systems, including IBM DB2 mainframe applications and System/36, with SAP software by the end of next year. R/3 was part of an extensive evaluation of other client/server application offerings, but it beat the competition in volume processing, Brown said.

SAP, page 129

All clears for telecommuting

By Mitch Letts
Time to hit the accelerator on those fledgling plans for a telecommuting program. By Nov. 15, large companies in the nation's toughest cities must have a plan for getting employees commuting by 25% to comply with the latest federal clean air law. The requirement will have an impact on an estimated 13 million employees in such metropolitan areas as Los Angeles, San Diego, Milwaukee, Chicago, Houston, Philadelphia, Baltimore and the New York/New Jersey region. Some pioneering firms, such as Newark, N.J.-based Prudential Insurance Co. and Palo Alto, Calif.-based Hewlett-Packard Co., are gearing up to include telecommuting as part of their compliance plans. Prudential has several business units where computer programmers and customer service agents now work from home at least one day a week, said Rita Rosencrans, associate manager in the insurer's clean air compliance office. Part of the reason is clearly the "Clean Air Act," she said. Environmental regulations are getting business units to start pilot programs, but then they are reaping other benefits such as reduced office space and more productive employees." Rosencrans added.

Telecommuting, page 129

COMPUTERWORLD'S EIGHTH ANNUAL SALARY SURVEY

CASH ON DELIVERY
Computerworld's Eighth Annual Salary Survey finds that IS professionals pay is increasingly linked to their performance and many more wish it was. Also, our readers reveal which jobs are hot, and where to find the biggest paychecks and benefits packages. **MANAGEMENT** page 62
Also, see **NEWS** page 20

What technology does your company offer telecommuters?

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Multiple responses allowed
Source: Research Research Group, Newton, Mass.

Telecommuting, page 129

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Continued from page 36

a Microsoft-centric organization" to piece together an integrated, componentized system, Ottavio said.

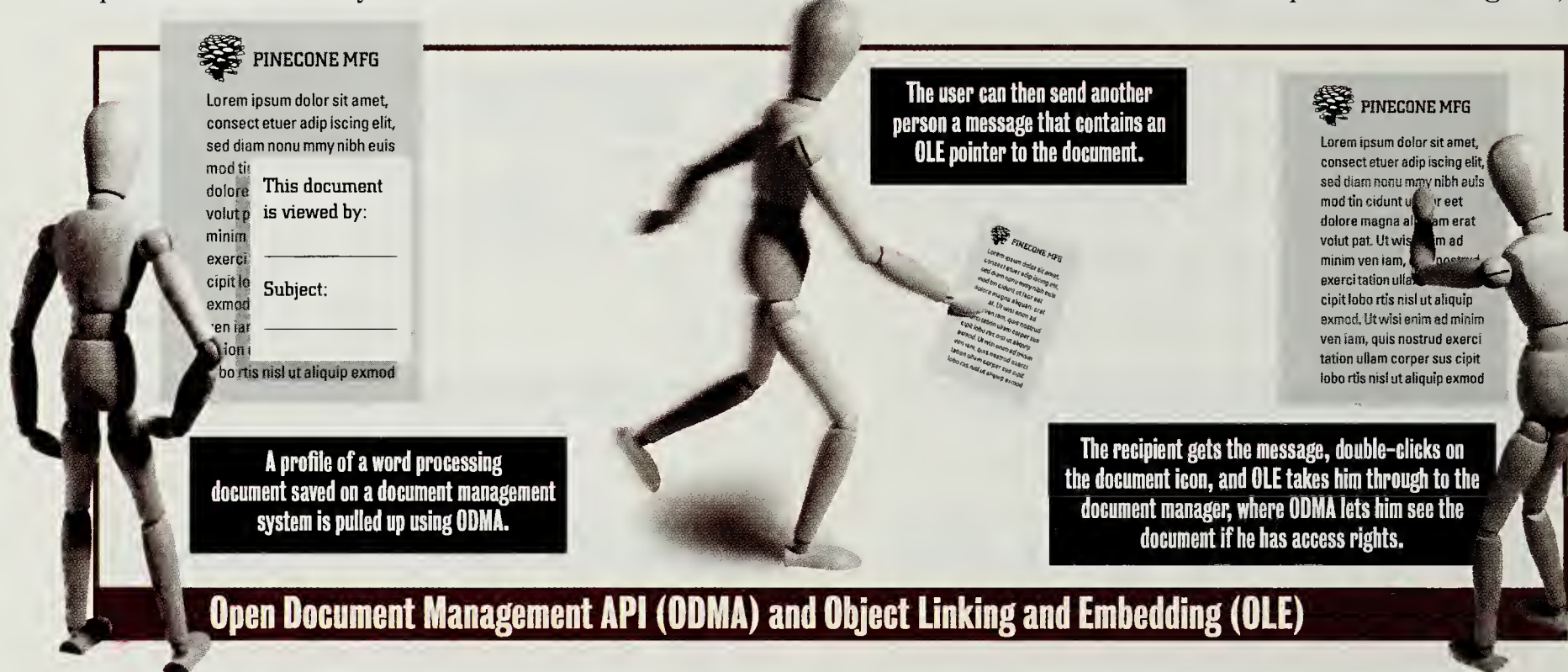
Many companies are using Lotus Development Corp.'s Notes as a document management repository, even though the product does not have basic functions such as check-in/check-out and workflow built in, Popkin said. However, KPMG said it veered away from Notes because the product's database structure is proprietary, and it reportedly doesn't perform well in heavy-use situations.

However, users warned that, regardless of the technology, failure to first improve the business processes can lead to unexpected delays and diminished returns when a firm installs a document management system. That's why, after a year of testing, Black & Veatch — a \$900 million consulting engineering firm in Kansas City, Mo., and one of the 400 largest private firms in the U.S. — still hasn't fully deployed its Documentum document management system.

"We've had it in for about a year,

and we have not gone to widespread use — not because of problems in the system but because we're still working on revised specifications," said Gerry Hart, manager of procurement.

As it turns out, getting the specifications in order is a major re-engineering effort. The company has 450 different procurement guides that specify requirements for items used in construction, such as utility-grade boilers and steam generators. When putting together a proposal, engineers select options from a guide,



Databases are at the heart of document management systems because they store indexing, management, scheduling and security information. So last year, when Oracle Corp. introduced Documents, a document management server, Detroit Edison Co. decided that was the way to go for a document system with the robust services regularly found in database software.

"One issue was backup and recovery," said Pam MacKinnon, supervisor of customer systems and enabling technologies at Detroit Edison.

The utility deals with nuclear facilities, so proper documentation is vital, she explained. "Oracle Documents uses Oracle systems, so information backup is just like on the database," she said.

Northrop's document management system enabled one of its aircraft division's centers to cut its document review cycle from six months to 10 weeks and reduce staff requirements from 12 people to three.

then send the marked-up document to a typing pool for production. From there it is mailed to bidders.

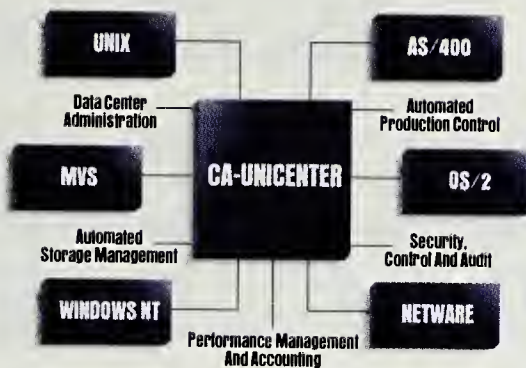
The re-engineering work will replace the 450 guides with one standard document. The Documentum system will allow engineers to open a copy of the document and plug in information from an integrated Oracle database. From there, the plan is for engineers to send the document to bidders via electronic mail. Once completed, the system will save the company 20% of the procurement production costs, mainly by saving time, Hart estimated.

And nothing is truer in the construction industry, Hart said, than the old saying, "Time is money." ■

Radosevich is a freelance writer based in Belmont, Mass.



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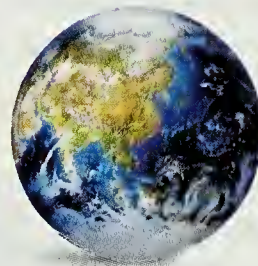


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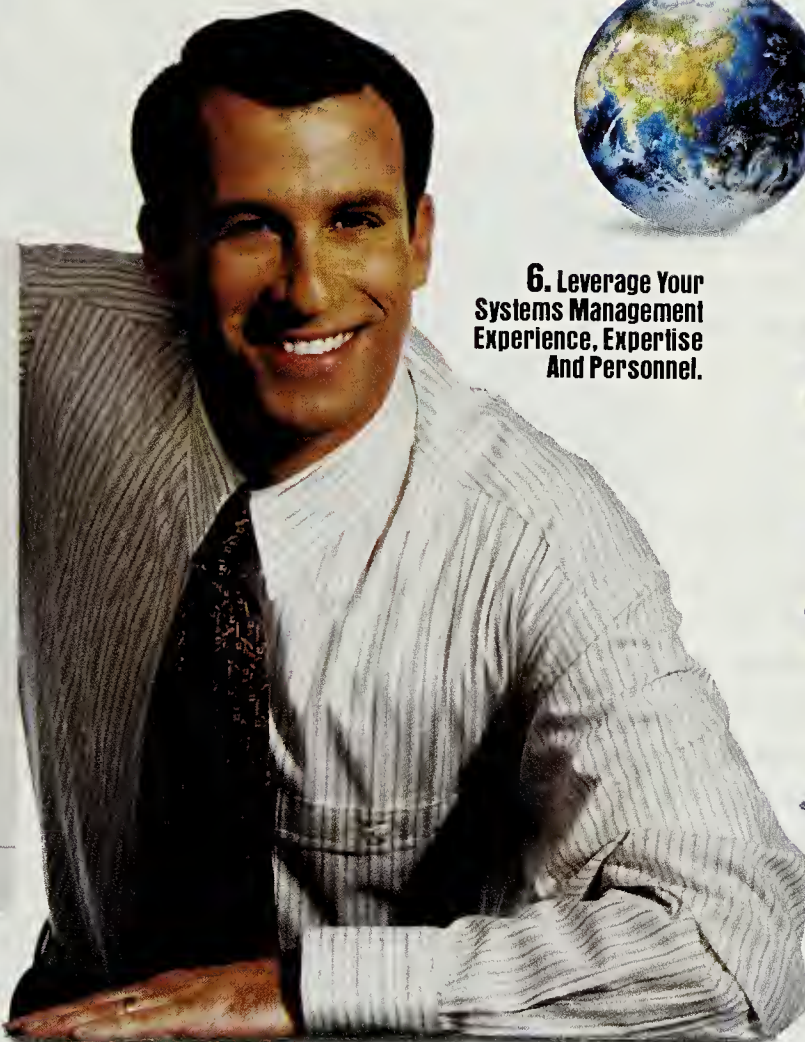


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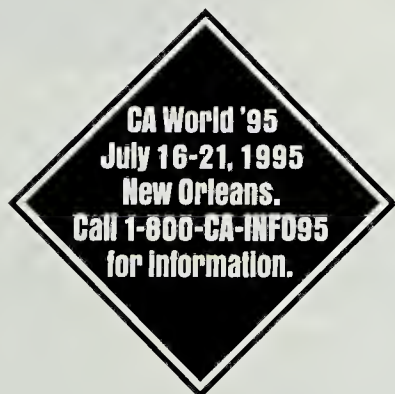
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Managing the Migration to Client/Server Networks

Client/Server Architecture clearly responds to today's business demands for flatter/decentralized organizations, faster-paced operations, and broader data access for end-users. However, managing the migration to client/server distributed systems requires rigorous preparation and planning. Information Systems and Network Managers must select and execute implementation projects carefully, keeping focused on applications which will most improve user productivity and effectiveness.

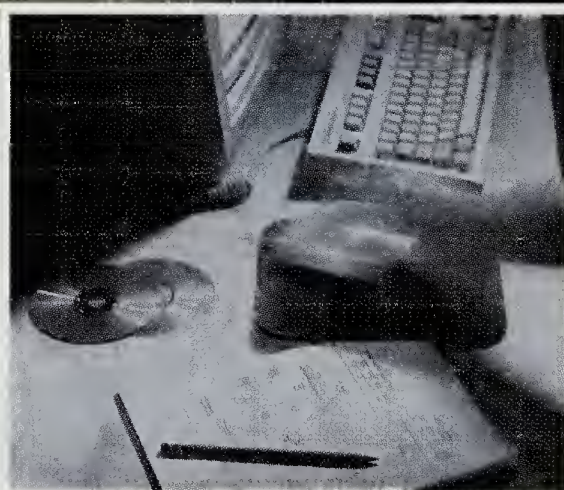
The new generation of client/server computing can yield tremendous benefits for the organization but only upon selecting and applying the appropriate design considerations and management methodologies.

While traditional models serve as a useful guide, many aspects are new and radically different. The addition of JAD, RAD, and Spiraling methodologies provide powerful new tools which require new perspectives on managing and implementing distributed architectures.

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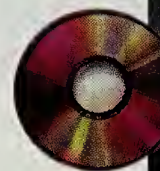
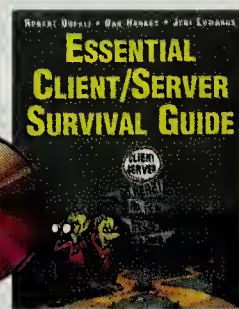
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An Xcellent Client?

BY JOHN WEBSTER

Client/server usually makes a mockery of even the best-laid plans for a uniform and consistent corporate information infrastructure.

Information systems managers are likely to manage multiple desktop environments that include a mish-mash of PCs, Unix workstations and mainframes. To help untangle the web of disparate operating systems, many firms are turning to X Window System — software that enables transparent access from the desktop to network applications residing on a variety of platforms.

Though X might not be entirely true to the distributed computing model (presentation logic — not business rules — is split between the desktop and server), it is helping IS groups on a more fundamental level.

In some cases, X provides a means of lowering Unix licensing costs while creating an easy migration path from mainframes to client/server. Moreover, it eases Windows/Unix coexistence — a key challenge facing client/server technologists.

Many Unix devotees employ some form of X, running on either a host server with X terminals as display stations or on PCs or Macintoshes accessing Unix client applications residing on servers. Others run X as part of a client/server architecture that combines a mainframe database back end, Unix application servers and X-capable desktop devices.

One exemplary setting is Repub-



The X terminal is evolving into a multiclient desktop

lic National Bank in New York, which operates a three-tier client/server architecture over an X.25 network. The environment includes 1,400 Tektronix, Inc. X terminals located at 72 locations in three states. The X terminals can display custom client/server banking applications running on the bank's 80 IBM RS/6000 Unix workstation servers. The X terminals can also access data residing on the bank's IBM, Digital Equipment Corp. and Tandem Computers, Inc. mainframes, located at different sites in the greater New York area.

"With X, we're able to run multiple sessions from multiple hosts," said Meir Gil, vice president and senior banking technology analyst at the bank. "When the mainframe is off-line, we can process data locally. Then when it's back on-line, we can store and forward the data."

Investing in X as part of large-scale, client/server implementations also helps IS departments minimize expenditures for new products.

For example, when the computer-aided design and manufacturing

engineering department at Toro Co. in Bloomington, Minn., wanted to increase the number of users accessing Computervision Corp.'s CADD5 software, administrators decided it would be impractical to purchase a Sun Microsystems, Inc. SPARCstation 20 for every new seat. The company purchased X terminals instead, enabling the department to use SPARCstations as servers, each running multiple sessions.

As a result, the company has 75 licenses for 30 workstations, which can be accessed by up to 100 users.

"Instead of running the application on 100 workstations and servicing 100 licenses, which with our hardware cycling plan would require us to purchase 33 new workstations per year, we have a scenario in which we only need to purchase 10 new workstations per year," said Ron Kozad, senior principal systems engineer.

X, however, is not without drawbacks: graphic-intensive applications perform noticeably slower than on workstations, and color mapping can be arduous. Also, the small screen size of PCs running X software is often inadequate for viewing some applications simultaneously.

Despite these shortcomings, however, analysts predict that X technology will continue to reside in some form on the corporate network.

"Especially in the technical market, X will continue to be viable," said Tom Wilmott, president of Aberdeen Group in Boston. ■

Webster is a freelance writer based in San Francisco.

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4GLs Come of Age

THE ARGUMENT THAT ONLY 3GLS PERFORM IS FLAWED. NEW 4GLS OFFER IMPROVED DEBUGGERS AND GREATER GRANU- LARITY IN AD- DRESSING COM- PLEX FUNCTIONS.

Is it true that real men (and women) write in 3GLs, and only wimps use visual development tools and 4GLs? It depends on what you're trying to accomplish and on the complexity of the programming problem.

The easiest way to decide whether to let developers program in C or C++ or to select a higher-level tool is to let your programmers decide. However, this might not be the best approach because programmers are typically eager to demonstrate their expertise and hone their skills by selecting a complex 3GL such as C++. They might argue that a visual development tool combined with a scripting language or 4GL simply isn't up to the job. I would urge managers to take a different approach.

Here's my perspective. The first time I moved from programming with Cobol to a 4GL many years ago, I found the process difficult. At that time 4GLs were immature. While 4GLs reduced the number of lines of code needed to create programs, they were hard to debug, and it was not always obvious how to do some of the simple things I had taken for granted in Cobol.

4GLs, however, have improved dramatically over the last decade or so. They come with sophisticated debuggers now and offer greater granularity in the way they handle complex functions. Most also let developers add 3GL code segments if something has to be customized.

Does this mean you should never let your developers use C or C++ again? And what about Cobol? There are situations where 3GL coding makes sense. For example, when a developer is creating a commercial application that requires a high degree of precision and speed, 3GLs may be appropriate.

If developers in the organization are al-

ready experts in certain 3GLs, it may be more difficult to build consensus around moving to a new way of working. For example, for organizations with hundreds of Cobol programmers, the rapid transition to a 4GL may prove to be a painful challenge.

But all things being equal, I recommend that you take a hard look at 4GLs and higher-level development tools. Many are becoming increasingly sophisticated, allowing developers to avoid some of the key pitfalls of 3GLs,

such as memory management.

These are complex issues even for experienced developers. In addition, most of the new tools on the market will allow developers to compile their 4GL code into a 3GL. Therefore, the argument that only a 3GL provides the performance (in the old days 3GLs enabled developers to more easily tweak their code) is flawed.

The choice of development language and tools should be based on business benefits, not on the technical aspirations of your programmers. The programmers may try to convince you that 4GLs simply cannot handle the complexity and performance they require. They may resist changing their thinking or behavior. That may be human nature, but developers' resistance to change should not drive technology decisions.

There are fewer and fewer reasons for developers creating commercial applications to rely on 3GLs today. My advice is to be armed with the facts. Establish a team consisting of business analysts as well as developers. Look at the problem from a purely business perspective first. And, avoid relying on myths about abstracted languages.

Higher-level tools are coming of age. They will save you time, effort and — in the long term — money. ■



JUDITH HURWITZ

Hurwitz is president of Hurwitz Consulting Group, Inc. in Watertown, Mass., a consulting, publishing and research firm specializing in client/server development tools, client/server infrastructure and systems management. She can be reached via the Internet at jhurwitz@world.std.com.

ONE BIT AT A TIME

SUCCESSFUL DATA MODELING FOR client/server systems is one part business process analysis, one part organizational politics and two parts alchemy. The process can be as risky as it is rewarding. A successful data modeling process can

set the pace for an organization's migration to valuable new technology. Muddled data modeling will have users and executives digging in their heels against the aggravation and high cost of a failed transition.

"If you get it right, everything else will be easy; get it wrong, and everything else will be hard," warned Ken Orr, a longtime application development guru and president of the Ken Orr Institute in Topeka, Kan.

Simply defined, data modeling "is the representation of your data relationships and data flows, independent of the physical implementation," said Marc Myers, president of Client/Server Connection, a consulting firm in Burlington, Mass.

Ideally, that representation converts a wealth of information formerly stored in flat-file or hierarchical databases into a format accessible to more versatile client/server applications.

The approaches to data modeling are almost as infinite as the types of data that organizations retain. But Orr suggested that they mainly fall into two large categories. In the first — a classic, top-down model — business processes are rigorously defined, creating an overall understanding of how the data is handled in the business. The second method, an outside-in technique, enables information systems analysts to determine the views of the data that users need to see. Developers then synthesize those views from the legacy data.

Neither approach is foolproof, however, because modeling tools are still not quite ready for prime time, according to users who have



**AN ENTERPRISE
DATA ROAD MAP
PAVES THE
WAY FOR
CLIENT/SERVER
MIGRATION**

BY AVERY JENKINS

gone through the process. Moreover, for data modeling to succeed, departments within organizations can no longer claim ownership of the data. Data must be considered a corporate asset that needs to be carefully secured yet easily accessible to authorized users across functional areas, IS executives said.

But rather than fit square pegs into round holes, some users have found that adopting a little bit of both strategies works best.

Eastman Chemical Co. in Kingsport, Tenn., has successfully employed a combination approach. In 1991, Jack Spurgeon, Eastman's vice president of computing systems, embarked on an ambitious plan to create a data warehouse that would transi-

tion between old-style, hierarchical databases and relational databases accessed by client/server applications.

Today, the data warehouse is filled with data coming from the company's business and manufacturing systems. The project was performed within budget, users are happy, and client/server applications are merrily computing away. Although Spurgeon began with an enterprisewide strategy, he did not wait until his modeling was complete before opening the warehouse for business.

"We didn't model all of the data before we did anything — just what we needed at the time," Spurgeon explained. "We let the individual business projects justify the move of the

data for that project."

Nonetheless, before embarking on this project, Spurgeon first analyzed the data he already had and how it was being stored. He found what he had expected. "We had gobs of duplicate data," Spurgeon said.

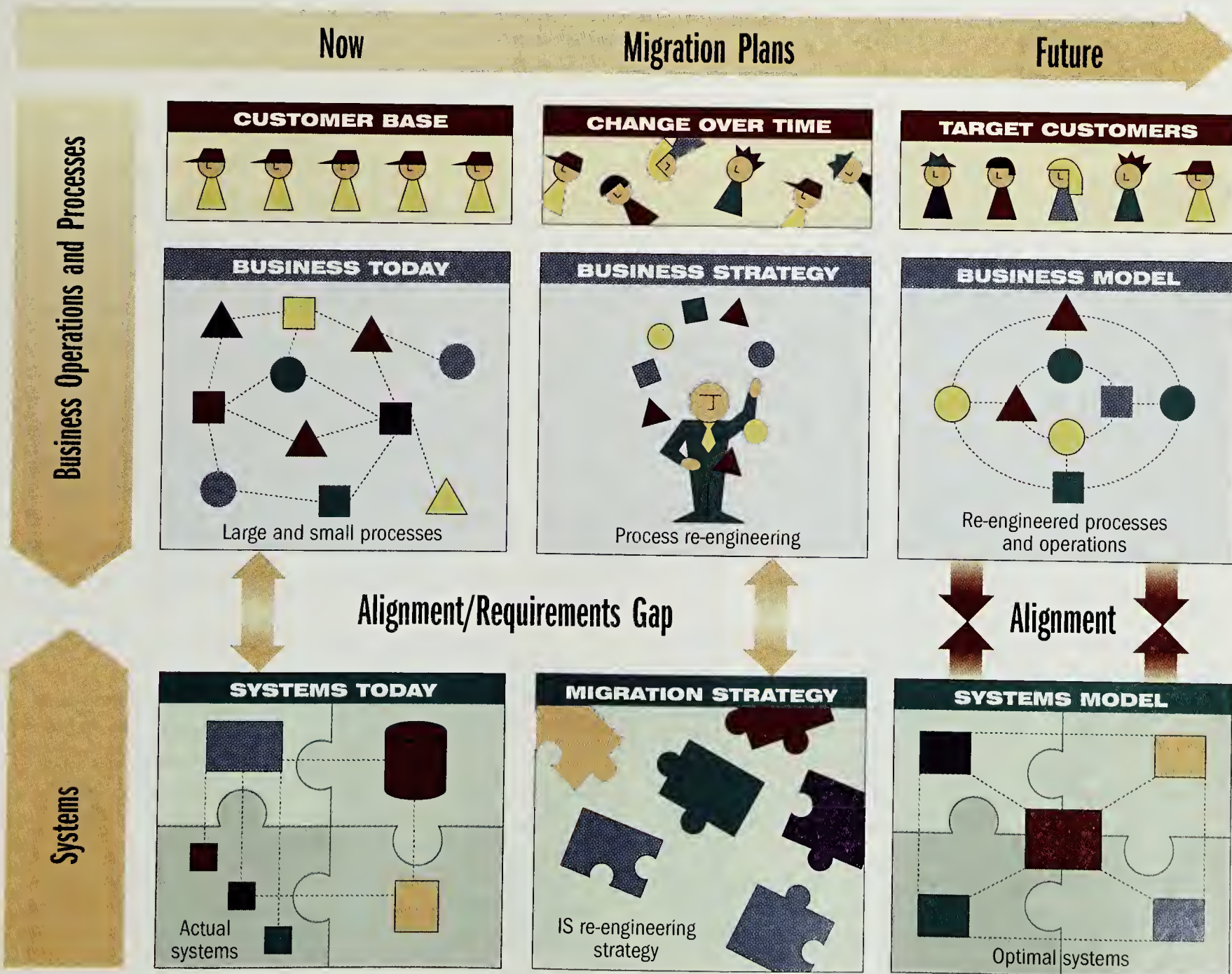
As a result, Eastman had extra work to do: identify, then eradicate redundancies. "That was real easy in one sense [because] all of our applications are documented, which included what data inputs we had," Spurgeon said.

The pivotal point was having up-to-date documentation. "All we had to do was take some time with the system analysts," who built a database to identify the duplicate items and re-

Please turn to next page

CRAFTING A PLAN

Some data modeling approaches begin with the development of a road map that illustrates how revamped information systems need to be aligned with changing business processes



Source: J.P. Morgan, New York; Computerworld Client/Server Journal

Continued from page 45
move them, he added.

But a piecemeal approach is not for everyone. John Karis, manager of end-user computing at Saks Fifth Avenue, Inc. in New York, took the top-down approach, which in his case was somewhat easier because of the relative simplicity of the data flow in his industry. The retail business is pretty straightforward, Karis claimed: "You order it and you sell it." That said, Saks' move to client/server decision-support and executive information systems still required some important data re-engineering.

His key objective, Karis said, was to "make it easy for any front-end tool to go after this data." He added, "The first thing we did was ... define the data to the most granular level," which then allowed Karis to "summarize it up and define a new table."

Conceptually, Saks defined the data as originating from a black box, Karis said. "The next thing we did was define each entity and how they related to each other," he explained.

Each of Karis' decision-support system applications requires about 50 entities, with each entity representing a separate table.

Which is why Doug Grant, manager of product and corporate systems at the British Columbia Auto Association (BCAA) in Burraby, British Columbia, lists "a good data dictionary" and "ensuring that people are using the same database attributes" among his four criteria for a good data model.

His other two significant attributes? "Make things as reusable as possible," Grant said, and "try to represent common business relationships as close to the data without making it the data."

Over the course of a three-year, \$1.3 million overhaul of BCAA's corporate systems, Grant moved the organization from a creaky, IBM-compatible mainframe to a Unix, Macintosh and PC-based client/server environment that now handles all of the club's IS requirements. "The mainframe went out the door" in Oc-

tober, along with its 18 legacy applications, Grant said cheerfully.

But the technical battles aren't always the hardest ones to fight. Other users have found that data modeling success depends on managing people as well as data. "You can't do this without organizational changes," said Sharon Sibigroth, vice president of information administration at The Equitable Insurance Co. in New York.

One key organizational change Sibigroth made was to eliminate the concept of data and application ownership by any one group. "It can't be tied specifically to any business organization," she said. "People have to believe that they have an equal stake" in the company's information assets.

The ideal data model, Sibigroth said, begins with "really trying to get people to say what is the data you need in your business." She said she forces business users and data administrators to "talk entities and attributes."

Unfortunately, "People want to

DIRTY DATA DILEMMA

Unfortunately, even the most accurate, descriptive and dynamic data model cannot eradicate one of the key problems of legacy data: poor data quality.

Thus, even after business processes have been analyzed, entity-relationship diagrams completed and a data dictionary written, somebody has to clean up the data. There are several types of contaminants that will pollute the legacy data pool:

- Lack of legacy standards among legacy files.
- Legacy information that is buried in free-form text fields.
- Multiple account numbers for the same entity, which inhibits a consolidated view of the entity.
- Anomalies for the same entity, such as DEC, Digital Equipment and Digital, all being used in a name field to identify the same company.
- Data values that stray from the meta data descriptions. For example, a personal name field that includes descriptors such as DBA, C/O, Trustee for, or other data "noise."

But even with an adequate data representation, the problems created by dirty data are not eliminated. For example, queries not including all of the aliases for an entity are destined to turn

up incomplete data sets. Similarly, data type confusion stemming from free-form text fields prohibits end users from using that data in their analyses.

Thus, when moving legacy data, users should have some means of "scrubbing" the data to ensure that the data getting across to the client/server system has some value.

Several approaches are available to help users. Meta data tools, while invaluable for helping IS analysts understand the data relationships, do little to ensure data hygiene. The various service bureaus that will clean your data for you are more useful.

Finally, there are also tools specifically designed to examine and clean data. Products such as Integrity from Vality Technology, Inc. in Boston parse, lexically analyze and highlight data patterns in the information coming from legacy systems.

While such tasks are not the common denominator of data modeling, users find that it makes sense to clean their data before moving it. Equitable Insur-

ance is using Integrity for "data scrubbing and manipulating all the different fields," said Sharon Sibigroth, vice president of information administration.

By employing such a tool to match and consolidate the data, Sibigroth's staff is better able to produce the views its end users require, she said.



get physical right away," she said. "Forget what exists — look at what is the primary logical view that you need."

WARNING LIGHTS

Despite the success these users have enjoyed in their modeling migration, each also has some regrets about the paths not taken along the way. "If I had to do it again, I would do primarily object modeling," Sibigtroth said. However, when she started, "we had no tools," she said. "We brute-forced our way into it."

Moving to client/server also necessitates changes in how the security is modeled. That's an area Eastman slipped on. "When you have data in a hierarchical fashion, you normally have the entire file secured," Spurgeon said. But "when you go to a relational database, only certain data elements need to be secured. Then you have to start figuring out how to

take a security package and go down to each data element."

To counter the problem, he developed a "data custodian" concept in which individuals are responsible for maintaining the security of their data elements.

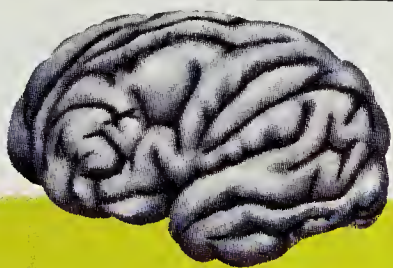
Despite such problems, the data modeling process has provided these users with a solid return on their investment. "It's given everyone much better functionality, with no trade-offs," BCAA's Grant said.

Equitable Insurance is just now seeing the payoffs: User departments have begun seeing the benefits in improved staff productivity and more informed decision-making, Sibigtroth said. "I'm now trying to shut down duplicate systems," she said. "That's when the IS organization begins to see the payback." ▀

Jenkins is a freelance writer based in Ansonia, Conn.

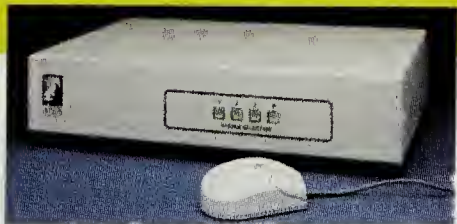


Eastman Chemical's Jack Spurgeon used a combination approach to data modeling



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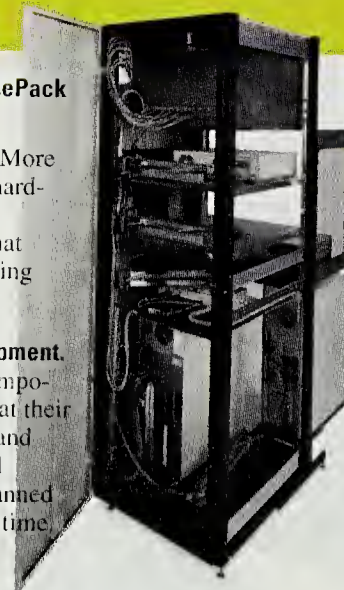
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The hot new applications segment in client/server computing these days is integrated customer information systems — what used to be called customer service and support software.

Right now, the market is more chaos than clarity. It's fragmented, lacks leadership and consists of a mixed bag of players, from old-timers to upstarts to niche players to companies intent on providing a full suite of applications.

What follows are interviews with the chief executive officers at two companies that help illustrate the approaches to client/server customer information systems.

First up is John Luongo, an ex-Oracle Corp. executive who now heads up The Vantive Corp., a 4-year-old West Coast upstart that boasts high performance, integration and client/server technology know-how.

Luongo is matched by Zack Bergreen, who in 1979 founded Applied Systems Technologies, Inc., which has since been renamed Astea International, Inc. Bergreen talks up the customer relationship, long-term commitments and avoiding technology deployment for technology's sake.

THE VANTIVE CORP.

HEADQUARTERS

Mountain View, Calif.

EMPLOYEES

81

1994 REVENUE

\$10 million*

CUSTOMERS

75

**Estimated*

CSJ When it comes to something as critical as client/server customer support software, why would a user company turn to a small, relatively new company such as Vantive?

LUONGO Even though we are young, we have over 75 client/server implementations, which is probably more than a lot of companies.

CSJ What about the risk factor of doing business with a small company?

LUONGO People who are making the decision to go into client/server recognize that the kinds of companies

Please turn to page 50

BY ROSEMARY CAFASSO

CUSTOMER- FACING

FRAY

CUSTOMER SERVICE SOFTWARE
VENDORS OFFER DIVERGENT VIEWS ON
HELP DESKS, USER EMPOWERMENT
AND ARCHITECTURES

CSJ When it comes to something as critical as customer support software, why would a user turn to an older company such as Astea for client/server software?

BERGREEN Clearly, if you are going to deploy mission-critical [software], you would like to utilize a company that has done it before. . . . We have a lot of Fortune 500 companies as our customer base, [which] is testimony that we have been able to provide [mission-critical] technology.

CSJ But our understanding is that the product line at this point is not fully
Please turn to page 51

ASTEA INTERNATIONAL, INC.

HEADQUARTERS

Chalfont, Pa.

EMPLOYEES

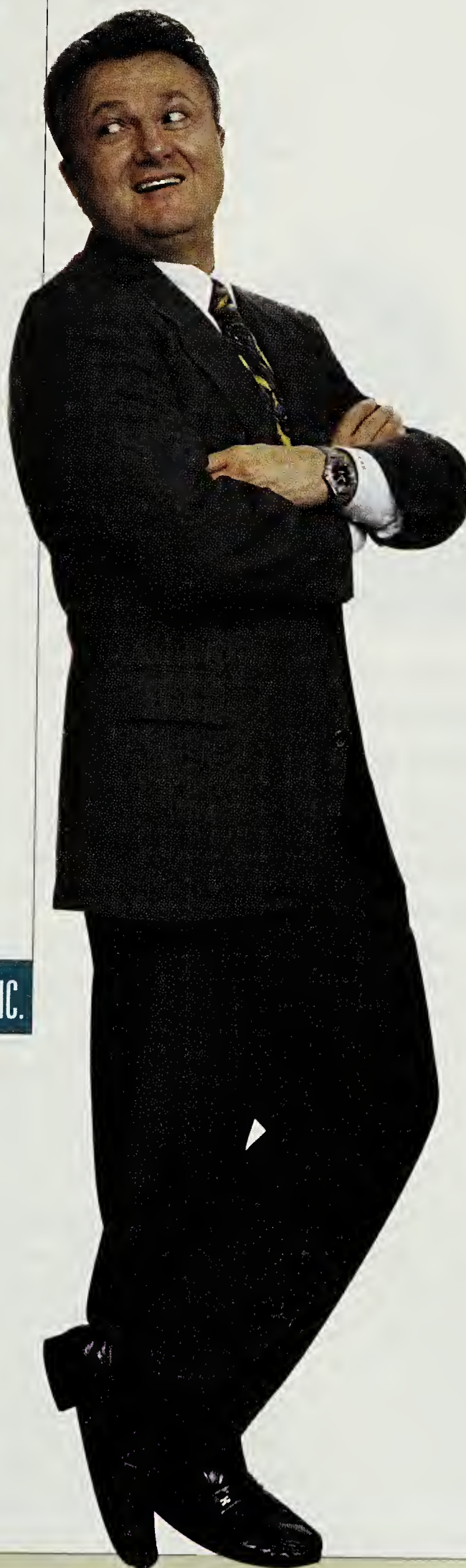
185

1994 REVENUE

\$22 million

CUSTOMERS

Approximately 650



Continued from page 48

they need to be dealing with will be, by definition, new companies. It's only the new companies that are truly implementing client/server from the ground up.

CSJ Vantive's software is described as a three-tiered architecture. How do you define this, and what is beneficial about it?



**"IT'S ONLY THE
NEW COMPANIES
[SUCH AS VANTIVE]
THAT ARE TRULY
IMPLEMENTING
CLIENT/SERVER FROM
THE GROUND UP."**

**JOHN LUONGO, CEO,
THE VANTIVE CORP.,
MOUNTAIN VIEW, CALIF.**

LUONGO First is the client machine itself — that would be the PC or workstation. Level 3 would be the database server, and the second level is what we refer to as an application monitor. It acts in many ways like a [transaction processing] monitor from the older architectures. We get a number of advantages from having those three levels. We are able to communicate between the client and application monitor much more efficiently, so we use about a third of the network bandwidth of most of our competitors.

CSJ Are you mostly replacing homegrown systems, or do you encounter situations where there is little or no automation?

LUONGO In about 95% of cases, we are replacing an existing system — either a homegrown one or replacing another product in our space.

But very few [customers] are starting from ground zero. A larger percent of them are first-time client/server customers.

CSJ What are you providing to help them tailor your software to their specific needs?

LUONGO We have developed our own tool set so we can allow people a tremendous amount of customization capability. We have our own API, and we use [Microsoft Corp.'s] Visual Basic integrated into our product to allow people to customize and interface to other systems.

CSJ Are customers using your software to reduce head count?

LUONGO I don't think that's an explicit objective. I think what they are mostly concerned about is bringing in a system that will allow them to handle larger loads over time, to kind of slow down the head count. I think the major motivation is to be able to change the profile of the support person. We let customers build a knowledge base about their product. It allows a generalist to be able to handle the calls.

CSJ Is there a risk of making folks too dependent on the technology?

LUONGO Well, there is going to be a dependence on technology. If you took a large call center and suddenly all the computers went down, their ability to help customers would be certainly weakened enormously. I think the solution is not to avoid using the technology but to place a high premium on the reliability of those machines. More people are looking at the customer support organization as a mission-critical application.

CSJ What about the concept of a mega-service desk in the future — it would be well beyond a help desk. Do you see this coming?

LUONGO There is a notion of a single response center, and employees will go to that response center to answer issues ranging from facilities issues all the way up to benefits and policies. I think you will see that within 12 to 18 months; it's a very near-term thing.

CSJ Who have you targeted as your chief competitors?

LUONGO I think it depends on the market segments. If we are looking at customer support applications among computer software companies, it would probably be Scopus. If we are looking at computer hardware companies, it would be Clarify. If we are looking at help desk opportunities, it would be Remedy and Software Artistry.

CSJ Do you ever go up against Astea?

LUONGO On occasion, but in the last year and a half, I would say maybe twice. The reason we tend not to see them is the market we are in is lead rich; [the customers] are coming to us. Also, if they are focusing on a modern client/server application, they will rule Astea out at some point. ■

Continued from page 49
client/server. Is that correct?

BERGREEN The product can operate either in client/server or in a non-client/server mode. From the onset, we separated the software into different layers: a database activity layer, a business logic layer and so on. You can place those different layers on different machines.

CSJ But can Astea do three tiers?

BERGREEN Absolutely yes, you can do that. [But] I would be cautious. This is still a relatively new science. You have to be extremely cautious to not allow the pendulum to swing too far to the technology side.

CSJ What do you provide to help users customize their own environment?

BERGREEN We have developed a template architecture. We allow the end user, without any access to source code, to change and adapt these activities and templates to the particular, specific business processes for a particular customer.

CSJ Are customers installing your software to reduce head count?

BERGREEN It's to change the way they do business, to get more out of the existing environment they have. I would hate to think our application is just serving that purpose — manpower reduction.

CSJ How can your software help customers do a better job?

BERGREEN It allows the different elements of a company to be tapped into. A salesman, prior to a sales visit, can get complete access to the customer record.

CSJ What about customer service personnel depending too much on this technology and not developing their own expertise?

BERGREEN There are no easy answers there. If you provide the front line with better tools and concentrate on the value-added activities, then you have helped them.

CSJ What about the concept of a mega-help desk? Do you see this coming?

BERGREEN Absolutely. As the data is collected in a more significant manner and it is flowing between elements of a company, I think there will be a clearinghouse.

CSJ What would be the real benefit?

BERGREEN The benefit of having all the information in one warehouse — the ability to tap into this data and utilize it in an optimum manner.

CSJ Who do you identify as your chief competitors?

BERGREEN I think it always has been internal MIS [and] companies that traditionally have had their own operational group that developed applications for the customer information environment.

CSJ But you must come up against other players such as Vantive or Clarify on occasion.

BERGREEN We certainly do. It boils down to a customer's [need for] a degree of comfort and the ability to rely on a vendor with a very extensive track record of effective deployment.

CSJ What about some competitors' comments that Astea won't compete as effectively because it isn't starting in client/server with a clean slate?

BERGREEN The funny thing is with these smaller companies, they can't compete with us when the rubber meets the road, when you talk about systems on a global basis. Companies don't just buy technology; they buy reliance on organizations that have been around for a while.

CSJ So, you think what they say is balony?

BERGREEN In so many words. . . . I can only refer to our successful track record. ■



"THE FUNNY THING IS WITH THESE SMALLER COMPANIES, THEY CAN'T COMPETE WITH US WHEN THE RUBBER MEETS THE ROAD."

**ZACK BERGREEN, CEO,
ASTEA INTERNATIONAL, INC.,
CHALFONT, PA.**

*Cafasso is a Computerworld senior editor,
Client/Server Software.*



First Union's Judge Fowler: 'We really underestimated the learning curve and the infrastructure needed to support a client/server environment'

CAPITALIZING ON

CLIENT/SERVER

Remember when banks were the primary source of lending and investments for U.S. businesses and consumers? Times sure have changed.

In the past several years, banks have suffered tremendous losses in market share. Securities brokerages and mutual funds companies have enticed consumers to shift their savings to higher-yielding investments. In addition, outsiders such as AT&T Corp. and General Motors Corp. have wrested away a large chunk of the industry's once-impentrable credit-card business.

Heightened competition and an inability to generate new revenue sources are making cost-cutting de riguer. However, recent regulatory actions, such as the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994, may bring some relief. Riegle-Neal will allow banks to conduct business across state borders beginning in September. This should help some institutions cut redundant resources such as data centers, analysts said.

BankAmerica Corp., for one, is

expected to save \$75 million in annual operating costs, analysts said. And, according to analysts, some of the savings at this and other banks are expected to be funneled into new products supported by client/server technologies (see story page 55).

First Union, a \$74.2 billion (in assets) bank holding company in Charlotte, N.C., sees client/server as a way to improve customer service while lowering costs.

As it consolidates 60 customer service centers into three service bureaus, the bank is equipping 2,000 service representatives with Compaq Computer Corp. PCs running OS/2. The bank is reconfiguring customer

data stored on Amdahl Corp. and IBM mainframes with Digitalk, Inc.'s Smalltalk object-oriented development environment.

First Union will be using Hewlett-Packard Co. HP 9000 Unix machines running Oracle Corp.'s relational database management system to transfer legacy data from the mainframes to the representatives' PCs. Message-Driven Processor from

Please turn to next page

**REALIZING
CLIENT/SERVER'S
PROMISE OF
INCREASED
FLEXIBILITY HASN'T
COME EASY TO THE
BANKING INDUSTRY.**

BY THOMAS HOFFMAN

Continued from page 53

Early, Cloud & Co. in Newport, R.I., will connect the Unix servers with the mainframe. In one implementation, First Union uses the HP servers as analysis repositories, which house customer information.

Customers will benefit by being able to dial an 800 number to inquire about all of First Union's products and services. By providing 24-hour, 7-day customer service with fewer staffers, First Union expects to improve its productivity by 20%, said Judge Fowler, senior vice president and director of systems development.

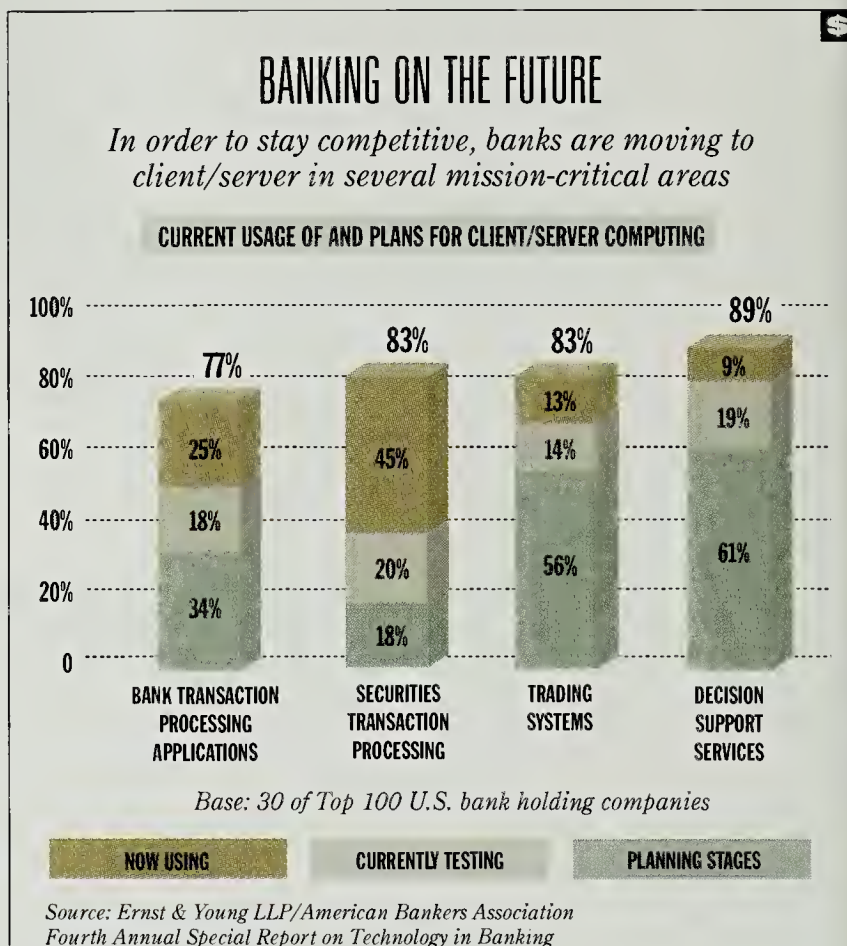
HOLDING ON TO CUSTOMERS LONGER

For example, when First Union wants to figure out why customers are exiting a particular market, business analysts will be able to use desktop query tools to examine the attributes of those customers, perform a statistical analysis of each customer's makeup to determine why it's removing its business and then regenerate the data to determine how to keep customers from departing.

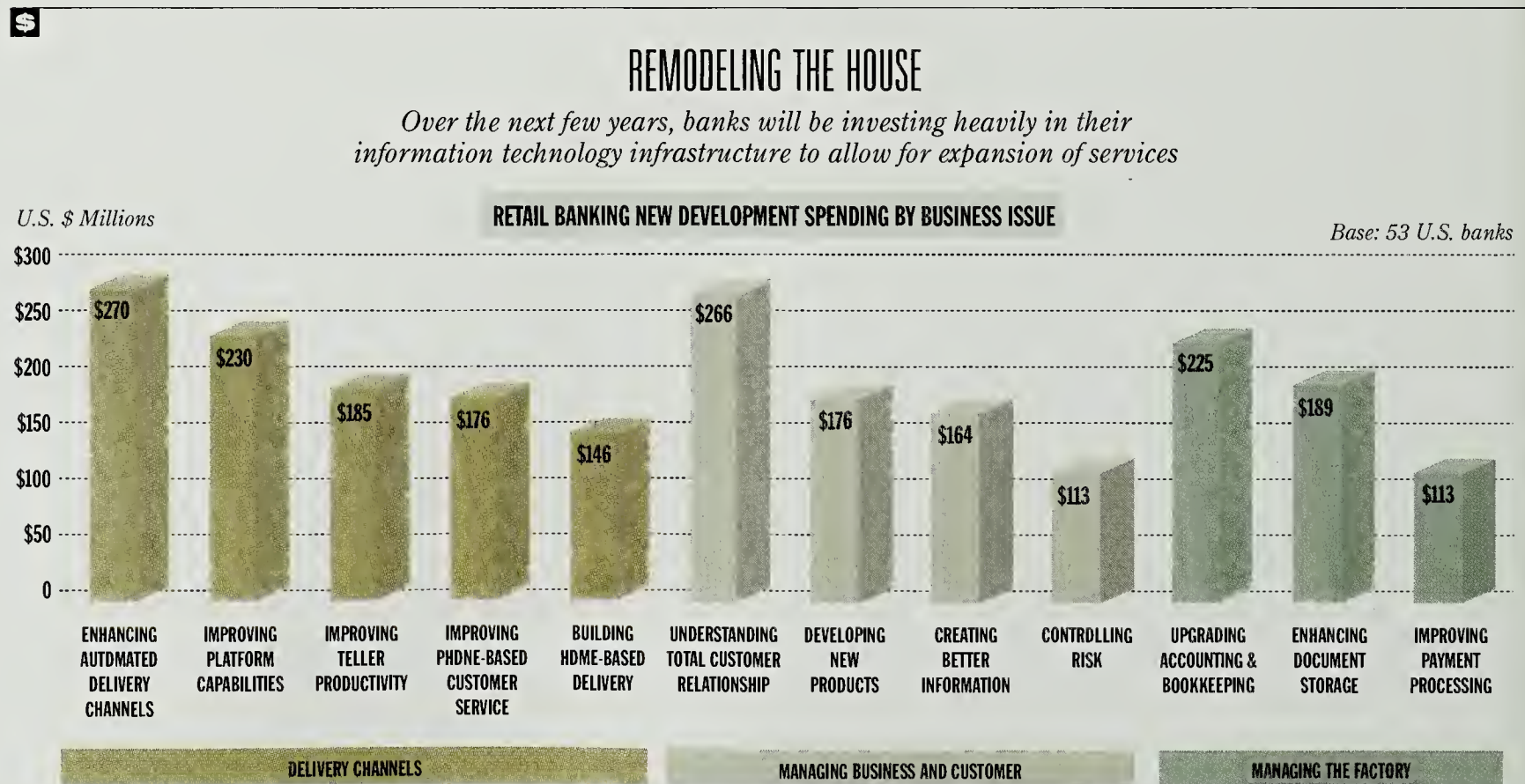
"It's real proactive work with customer information," Fowler said, adding that a similar host-centric scheme would have been too expensive and time-consuming.

The project, which is scheduled to be completed by July, represents one of several forthcoming client/server initiatives that First Union executives said will enable the bank to set up functional units that serve the entire organization. "As I see it unfolding, the traditional legacy systems banks use for transaction processing will become deemphasized, as most of the new development is occurring in client/server and is evolving toward functional business units," Fowler said.

KeyCorp has taken a different approach. The Albany,



N.Y., bank has invested \$50 million since 1989 to outfit front-end tellers and customer service reps with intelligent workstations. Since then, KeyCorp agents at more than 1,000 branches in the Northeast and Northwest have used desktop packages to open new deposit accounts and access loan origination data from the bank's IBM mainframes using an IBM PS/2 server over an IBM OS/2 LAN, according to Robert L. Tucker, executive vice president and manager of information systems at Key Ser-



vices Corp., the bank's IS services arm in Cleveland.

When KeyCorp's sales agents open a deposit account or secure a loan for a branch customer, they can also use the client/server configuration to cross-sell proprietary and other mutual funds simultaneously. Using IBM PS/2 workstations, KeyCorp sales agents are able to dial into file servers at Putnam Investments or Fidelity Investments, whose mutual funds KeyCorp also sells.

While KeyCorp has its own qualified sales agents who can sell mutual funds directly to customers, the client/server configuration should be most beneficial to sales agents at the bank's rural branches, where interaction with certified Putnam and Fidelity agents will be crucial. "Sixty percent of our branches are in rural communities, where there are no full-range insurance brokers or financial services agents," Tucker said. "Client/server is so fundamental to the way we're doing business now as we've changed to a sales-oriented culture that I don't think we could have made the transition without it."

HARD LESSONS TO LEARN

Still, realizing the promises of increased flexibility and low overhead using client/server technologies hasn't come easy to the banking industry. Fowler, for one, said First Union's plunge into client/server computing in 1991, with a real estate relocation application called The Newcomer system, cost the bank 200% more than it would have to develop the application using an IBM CICS mainframe configuration. "We really underestimated the learning curve and the infrastructure needed to support a client/server environment," Fowler said.

And even now that the bank has firmly grasped the need to deploy LAN administrators and to test regularly for disaster recovery, First Union's latest client/server development efforts still run at 150% of the cost of comparable mainframe projects, Fowler said. "Generally speaking, if I hire a Cobol or [IBM] DB2 person from a consulting company in Charlotte, they typically cost \$40 an hour. An Oracle or Smalltalk programmer costs more like \$60 to \$70 an hour, and there are a lot of so-called client/server experts that really aren't experts," he added.

But some banks have found solutions to early client/server riddles. For example, a \$10 million client/server effort, called PRISM for Performance, Results and Income Sales Management, was designed to make customer data accessible to branch employees at Union Bank in San Francisco.

"What the user discovers is that when they get into an SQL environment, they get involved not only in the GUI environment, but they also learn how to make information more effective," said Charlie Pedersen, executive vice president of the operations and automation group at the \$16.8 billion (in assets) bank. ■

Hoffman is a Computerworld senior editor, User Strategies, in the Rochelle Park, N.J., office.

FAMILIARITY BREEDS CONTENT

BankAmerica Corp. has taken a decidedly "standard" approach to branch banking. By the end of this summer, the systems that Bank of America tellers use in Arizona will have the same look and feel as systems their peers use in Hawaii or Nevada.

That's because the San Francisco bank holding company is standardizing its front-end delivery systems and back-end accounting operations at 550 of its non-California branches. The move will provide customers with similar products and services, regardless of their branch. Moreover, by supporting one branch banking platform, Bank of America hopes to reduce operating costs.

Thanks to numerous acquisitions over the years, the \$214 billion (in assets) bank ended up with a plethora of branch banking platforms across the Western U.S. The new systems — whose rollout is now 40% complete — include a front-end delivery system for platform and teller automation called Encore and a Unix-based package from Culverin Corp. that AT&T Global Information Solutions is customizing for the bank.

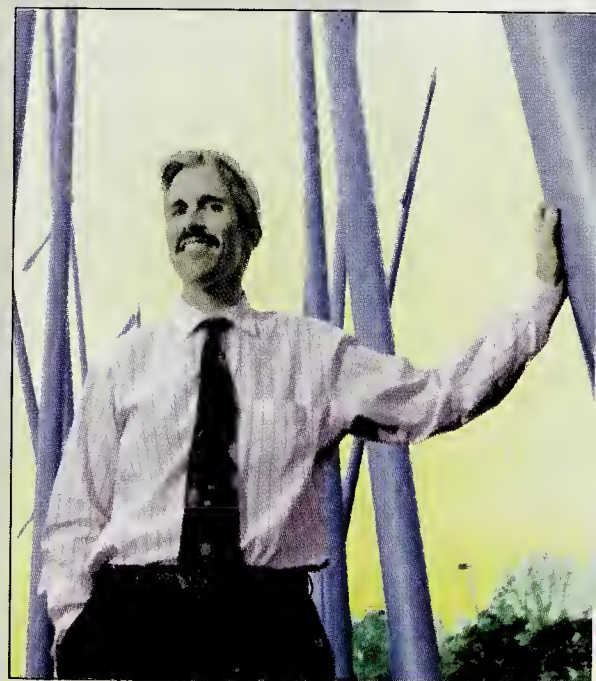
Bank tellers and customer reps will use Compaq PCs to access customer data housed in IBM CICS files residing on an

IBM ES/9000 mainframe using AT&T 3550 servers running Unix. To standardize its back-office accounting, the bank has outsourced these operations to M&I Data Services, Inc., a Milwaukee service bureau, said Mark Bowler, vice president at the bank's interstate banking systems group.

"What we want to do is provide a single image to our customers across geographic lines," said Jim Burke, senior vice president of distributed computing technology services at the bank.

The new systems will let bank employees train on the same systems so tellers can relocate to other branches and still be intimate with the system. Plus, the effort is expected to streamline the large number of applications resulting from Bank of America's acquisitions frenzy (see story page 23).

"We're finding that we can open up historically closed environments to office automation so that different departments can share information more freely," and the bank can cut administrative costs, Burke said.



Bank of America's Jim Burke wants to give customers a single banking image

CASE STUDY

What follows is the first installment in a series of in-depth articles that will examine how organizations make the transition to client/server computing.

Client/Server Journal intends to monitor these organizations' progress, reporting on every major milestone — and misstep — they experience along the way.

As you read this, executives at Unifi, Inc. are putting the final touches on a strategic blueprint that will lead the \$1.4 billion textile manufacturing powerhouse into a more enlightened information technology era.

The blueprint will help the 14-year-old Greensboro, N.C., firm sew together an enterprisewide, client/server computing network that would for the first time let knowledge workers across functional areas share business-critical information and enable division heads to manage their operations more proactively. The architecture is critical to competing in the post-GATT economy.

Unifi already stands as one of the more

successful outfits in the disintegrating domestic textiles business: It has grown 40% since the turn of the decade, mainly through acquisitions and a fine-tuned, highly automated manufacturing strategy that has kept labor costs to less than 10% of operating expenses.

Surprisingly, Unifi has excelled while spending less than 1% of revenue annually on information technology. Such stinginess earned Unifi top honors in the 1994 *Computerworld Premier 100* [Sept. 19, 1994], which ranked organizations that accomplished the most with the least investment.

"They are a superbly managed company," said Guy Ford, a research analyst who follows textiles for Scott & Stringfellow, an in-

UNIFI WEAVES
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INTO GROWTH
PLANS

CUTTING A NEW CLOTH

UNIFI, INC.

MISSION

Revamp business processes to increase global competitiveness by enabling cross-functional access to data via enterprisewide, client/server network

FISCAL 1994 REVENUE

*\$1.38 billion **

FISCAL 1994 PROFIT

*\$76.5 million **

NUMBER OF EMPLOYEES

4,770

IS PERSONNEL

75

IS BUDGET

Less than 1% of revenue

IS ARCHITECTURE

Five IBM AS/400s communicating in batch mode; unknown number of stand-alone Intel 8088-based PCs

** Fiscal year ended June 26, 1994*

vestment banker in Richmond, Va. Information technology "may be one of the few areas in which Unifi is behind the curve."

Hard to believe, given the company's reputation as an aggressive and astute competitor that controls more than 70% of the U.S. polyester business and has acquired its way into the fast-growing but highly competitive spun-cotton market.

Unifi's benign neglect of information technology is about to change, however. The company intends to spend in excess of \$10 million during the next three years on a client/server architecture that will support a new way of doing business and extend its already formidable global reach.

A four-month study scheduled to be completed later this month should help guide

BY ALAN ALPER



Unifi from its single-product, single-plant business model — run via loosely connected IBM AS/400s — to an enterprisewide client/server network. The company will make application and infrastructure choices once the blueprint is finished.

“What’s most important is we need to find where systems do not support the business or the processes” and correct that, said Ralph Mayes, the 45-year-old chief information officer who joined Unifi last September to lead its technology transformation.

For example, Unifi hopes client/server will enable knowledge workers and operations staffers not only to communicate internally and with global customers but also to have real-time access to information about orders, shipments and currency, trade and tariff conditions at any point in time, Mayes said.

Top executives within each division are providing strategic input. Moreover, tactical assistance is coming from nine key operations staffers from various divisional sectors who have worked full time for the last three months to make sure the blueprint is synchronized with the way people need to work.

How can Unifi afford to take key staffers off their posts? “Unifi’s position is it couldn’t

afford to do anything else,” Mayes said.

“IS typically doesn’t know the right answers and in many cases doesn’t know what questions to ask,” said Gary Baldwin, an Ernst & Young consultant on the project. “The operations guys have the questions and can help find the answers.”

Then there are political and attitudinal reasons: Operations staffers “will hopefully tie things back to their managers, helping to build consensus and understanding. They also become user advocates,” Mayes said.

Baldwin, for one, said Unifi’s successful adoption of factory automation has prepared it for a wholesale change of information technology. “The company has the right mind-set. It understands that by adding new cost-effective machinery to the factory, you increase capacity and efficiency,” he said.

Proof is in the funding: The project is being accounted for as a capital expenditure outside the IS budget line. “We’ve gotten where we are by investing in the future; this project therefore is seen as a long-term investment,” Mayes said. ▀

Alper is the editor of Computerworld Client/Server Journal.

Unifi’s Ralph Mayes:
‘We’ve gotten where we are by investing in the future’

Keep Garbage Trucks at Bay



SHAKU ATRE

Atre is president of Atre Associates, Inc., a Port Chester, N.Y., consultancy that specializes in client/server technologies.

One of the most serious misconceptions held about client/server application development is that discipline and rigor are not really necessary. Because client/server's graphical development tools are supposedly "intuitive" and because its development cycle is accelerated, many people assume application development can be performed in an ad hoc fashion.

In short, technologists often assume that the development process can manage itself. After all, client/server is supposed to be simple, straightforward and cheap — a chance for hackers to finally build a mission-critical system.

Unfortunately, organizations that try to build ad hoc client/server systems are going to give a new spin to the phrase "garbage in, garbage out." If built ad hoc, these systems will become garbage trucks that take in valuable corporate data and turn it into trash. The data will become corrupted because of a lack of security, integrity and concurrency and because of inadequate work done on requirements development, analysis and code and stress testing, among other things.

Let's look at why project management is such a critical component of client/server.

- Client/server's rapid pace of development calls for more project management, not less. Generally, functionality should be delivered in six months or so, with more functionality added at six-month intervals. With this kind of pressure, there is no time for problems to iron themselves out. To prevent fires, a strong project manager must perform estimation of resources (hardware, software, technical staff and user resources required) and of time.

- Phases overlap or take place simultaneously. When building client/server systems, you must properly coordinate overlapping re-

**ORGANIZATIONS
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quirements, analysis, design, coding, testing and stress testing phases.

- Multiple deliverables and multiple disciplines. The fact that phases overlap means there are multiple deliverables with multiple interdependencies. In addition, client/server development teams must be able to apply many diverse disciplines. This implies that some team members will have more than one role in a project

(i.e., a person who writes requirements may also design the tests). Because phases overlap, someone needs to juggle team members' schedules.

- Multiple interfaces. The components, or deliverables, of the client/server system come together at the interfaces. As a rule of thumb, "dirt collects at the interfaces" because it is here that the sticky systems integration issues arise in client/server's multivendor environment. Typically, organizations underestimate the effort needed and budget no time for connecting the interfaces.

- Complexity. The more components, the more potential points of failure, the more complex the overall design of a client/server system needs to be. This means someone in charge needs to introduce and manage discipline in development practices.

- Technology is not the issue. Rather, the issue is how to solve one or more business problems with the new client/server system. You need a project manager who understands and will actualize the business aims.

- Risk. Client/server projects are risky. We want to manage risk, not embrace it. Unfortunately, when the going gets rough, project managers can get cut in cost-savings efforts.

What happens when an organization embarking on client/server gets rid of its project managers? You can hear the garbage trucks revving up their engines in the distance. ■

WHAT'S NEW

A ROUNDUP OF NEW PRODUCTS AND REVIEWS

A Spryer Way to Tap the Net

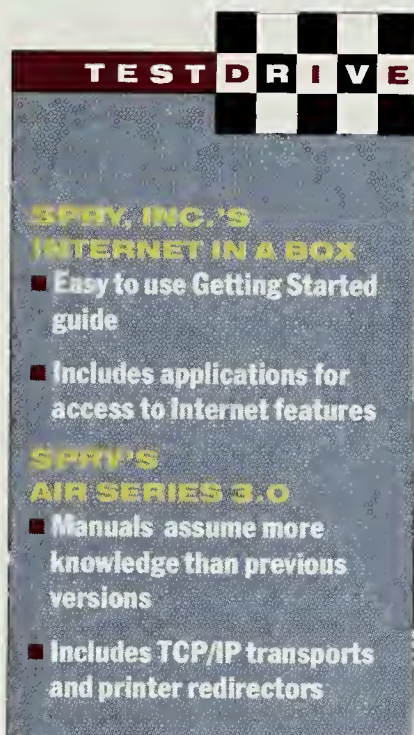
BY CHRISTOPHER LINDQUIST

Once the domain of tech-nophile academics, the Internet now has something for everyone. But until recently, few knew how to get there. Now a variety of new tools has brought the Internet to the average user, for better or worse.

Spry, Inc.'s Internet In A Box and its more corporate sibling, the Air Series 3.0, provide smooth end-user access to the Internet. But unless systems administrators are careful, the result may be more money lost in connection charges and reduced productivity than any gain from information plucked from the Internet's near-limitless depths.

Internet In A Box and the Air Series are similar on the surface: Both include a suite of applications designed to let users access various Internet features, including the World-Wide Web, electronic mail and Usenet news. Other Spry tools provide for file transfer protocol file retrieval, remote system log-in using Telnet and UUEncoding and UUDecoding of binary files.

The primary differences between the two packages lie in the manuals and in the Air Series' network integration capabilities, which allow users to access both local resources and remote, Internet-based

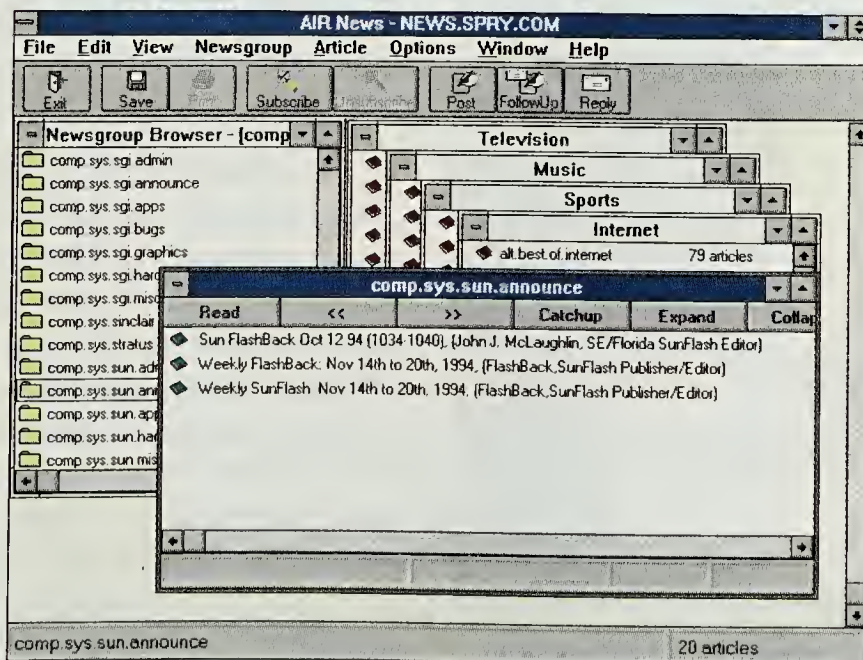


data from their desktops.

Internet In A Box, priced at about \$149, doesn't make connecting to the Internet as simple as connecting to other on-line services, such as CompuServe, but it comes close. The software offers a default means of setting up a Point-to-

Point Protocol (PPP) account on the InterServ service. The Getting Started guide walks users through the steps of using Air Mosaic, Spry's graphical, point-and-click interface, to find information through the Web, as well as find and retrieve files, read E-mail with Air Mail and browse in the Usenet newsgroups with Air News.

The Air Series 3.0 manuals are much more technically oriented than for previous versions and assume some knowledge of the user's network configurations and available protocols. They also assume that PPP connections, if desired, are already available. A number of network-specific tools—including Microsoft Corp. and Novell, Inc. TCP/IP transports and printer redirectors—are available to make connecting to existing



INSIDE

NETWORKING ROUNDUP

- TGV's security software
- NetFrame's network server
- Digital's Asynchronous Transfer Mode switch
- Security Integration's virus protection software

FIRING LINE

- NetWare 4.1

networks as easy as possible.

The Air Series can be purchased in several single-user configurations that range in price from \$199 to \$449, depending on the tools provided. The end result is an Internet-enabled network from which end users can access local corporate data and outside Internet resources without having to know exactly where the information resides.

In a perfect world, where users spent time looking only for information that would help the bottom line, such a situation would be ideal. But this isn't a perfect world, and while both Spry products are easy to use, neither lets network administrators restrict users to necessary tasks. There is no way to tell whether users are spending time researching critical information and retrieving time-saving software or downloading the latest Dilbert cartoon and reading about sexual fetishes.

Users will spend time doing things unrelated to work, and you'll pay for it in connect charges, lost productivity or both. So while IS can no doubt find good use for Spry's tools, such as technical support via the Web or as an information resource for select users, neither tool is quite ready for widespread use.

Spry, (800) 777-9638 ■

Lindquist is the technical editor of Electronic Entertainment magazine.

Security, Server, ATM and Virus Protection Developments

SECURITY SOFTWARE

SECURE/IP

TGV, Inc.
Santa Cruz, Calif.

WHAT: Secure/IP is token-based software that prevents unauthorized access to Digital Equipment Corp. VAX- or Alpha-based OpenVMS servers connected via TCP/IP networks. Users carry a device that receives onetime passwords, or tokens, electronically from an authentication server, which then permits access to systems connected via a TCP/IP network. Secure/IP runs on top of TGV's MultiNet TCP/IP connectivity software. It works with token systems made by various vendors including Security Dynamics, Inc. in Cambridge, Mass.

WHERE: The software secures OpenVMS systems connected over wide-area networks, accessed via dial-up links or linked via the Internet. It provides seamless integration with OpenVMS by extending

normal log-in facilities to support token-based authentication. MultiNet 3.3 and OpenVMS VAX 5.5 or OpenVMS AXO 1.0 or later is required.

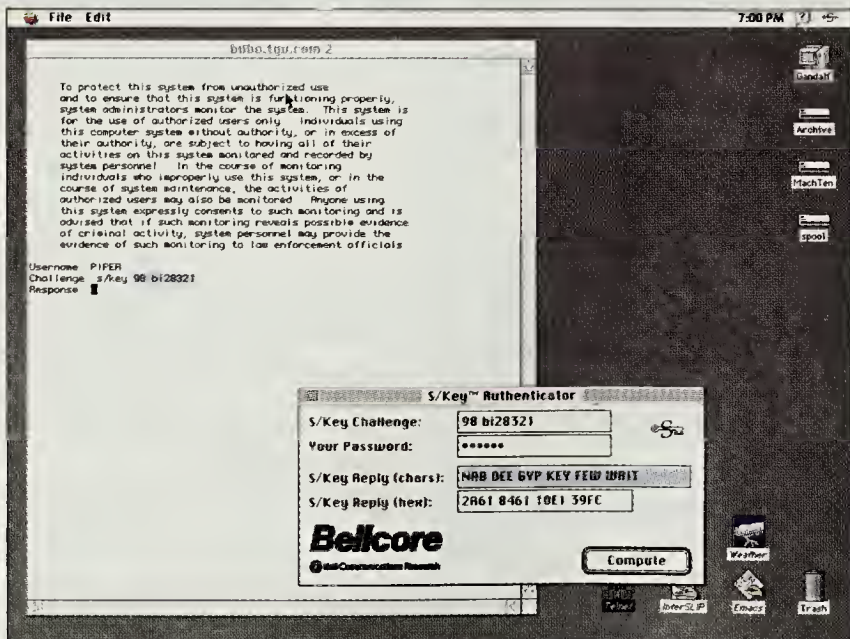
WHEN: Available since earlier this year.

HOW MUCH: Pricing ranges from \$1,000 to \$12,000, depending on number of users.

USER FEEDBACK: The City of New York University recently beta-tested the product with Security Dynamics' SecurID's token system to secure research and administration systems that can be accessed via the Internet, according to Anil Khullar, a research analyst at the university. "The [technical] users testing it are happy, but it's the end users who need to be convinced that security is something we have to take seriously." The university, he said, realizes it can protect only some accounts and systems. Secure/IP "helps with that."

PHONE: (408) 457-5200

**NEW
PRODUCTS**



Secure/IP uses tokens, which replace long-standing passwords

NETWORK SERVER

CLUSTER SERVER 8500

NetFrame Systems, Inc.
Milpitas, Calif.

WHAT: The Cluster Server 8500 is a series of Intel Corp. Pentium-based multiprocessor superservers with built-in fault tolerance and server

management. The architecture supports up to 12 clustered processors with up to 2G bytes of shared main memory; up to four 100-MHz Pentium processors in a symmetric multiprocessing complex; up to 100M bytes of aggregate I/O bandwidth for Ethernet, Token Ring, Fiber Distributed Data Interface and SCSI devices; and continuous processing using redundant power supplies and cooling, redundant arrays of inexpensive disks support (Levels 0, 1 and 5), error checking and correcting memory. An optional Gemini mode enables fault tolerance. In this mode, dual Pentium processor/cache modules operate in tandem.

The system supports Simple Network Management Protocol console tools and offers remote console capability from any network workstation. All existing NetFrame servers can be field-upgraded.

WHERE: Initial support is for Novell, Inc. NetWare 4.0 and Unix; Windows NT support is expected in April.

WHEN: Initial shipments began in early December.

HOW MUCH: Comes in three

models: The NF8500 lists for \$89,950 and is equipped with 64M bytes of system memory, a 486 I/O server providing two Ethernet connections, one Fast/Wide SCSI channel, a 2G-byte Fast/Wide Live-Drive and Maestro cluster management software; the NF8500HA is priced at \$104,950 and adds redundant I/O servers and power subsystems; the NF8500AS includes a Pentium-based application server and lists for \$139,950. The Gemini option is priced at \$11,500. NetFrame systems are sold through resellers and integrators.

USER FEEDBACK: Keyport Life Insurance Co. is planning to field-upgrade later this quarter a NetFrame NF450 to an NF8500AS running an annuities processing system that is operating at between 88% and 92% of capacity, according to Lenny Reis, a networking services technical manager.

"Overall, we found an over 60% performance increase with the server, which is much less than what NetFrame is claiming, but that has to do more with our old application, which was not expected to grow as large as it did — there's a lot of overhead," Reis noted. The NF8500 will enable the Boston-based insurer to expand the system from 175 users to about 300, he added.

Keyport likes the Gemini mode feature but said it hasn't seen much use for it because "we've never had an abend due to hardware," Reis said.

PHONE: (408) 944-0600

ASYNCHRONOUS TRANSFER MODE

GIGASWITCH/ATM SYSTEM

Digital Equipment Corp.
Maynard, Mass.

WHAT: Gigaswitch/ATM System is a 10.4G bit/sec. Asynchronous Transfer Mode (ATM) switch for use in LAN backbones and high-performance workgroups. A 155M bit/sec. adapter card, ATM-works 750 Network Interface Adapter, provides Turbochannel-to-ATM connectivity for DEC 3000 AXP systems.

The switch can be managed by a Simple Network Management Protocol network management application and through any out-of-band management interface via a Telnet session.

WHERE: Gigaswitch/ATM System supports up to 52 155M bit/sec. Synchronous Optical Network (Sonet)/SDH multimode fiber ports using a 10.4G bit/sec. switch fabric. Digital intends to support T3/E3 and 622M bit/sec. Sonet/SDH. Permanent Virtual Circuits and Switched Virtual Circuits are supported, as are Constant Bit Rate, Variable Bit Rate and Available Bit Rate.

Devices that connect to the switch's ports must comply with the ATM Forum's UNI Version 3.0.

WHEN: Available 90 days after receipt of order.

HOW MUCH: The switch lists for \$25,740, plus no more than \$2,600 per 155M bit/sec. port when fully configured. Adapter card is priced at \$2,499.

USER FEEDBACK: The University of Miami's Rosenstiel School of Marine and Atmospheric Science is deploying the switch to more quickly dis-

tribute satellite data to a mix of networked Digital Alpha and Silicon Graphics, Inc. (SGI) workstations for more timely analysis. "We're pushing better than 50G bytes per day (each image file is from 40M to 400M bytes), so we're migrating the information transfer to a higher-bandwidth" medium, said senior research analyst Peter Evans.

The expected launch of satellites with higher data rates mandates the upgrade to ATM from the laboratory's current hybrid Fiber Distributed Data Interface and Ethernet network, Evans said. Within the next year to 15 months, the school expects to have 25 to 30 Alpha and 10 to 20 SGI workstations networked with two or three Alpha 2100 multiprocessor servers, he added.

Longer term, the school hopes ATM will enable interdisciplinary labs across the university — as well as at outside institutions — to better collaborate on research. "We could teleconference, and everyone would be looking at the same data and present their own text," Evans said.

The school is also involved in a wide-area ATM pilot project with the U.S. Navy and another university. MCI Communications is the service provider. "Early transfers were not stellar," Evans said, citing sustained data transfer rates of between 6M and 10M bytes. "A lot of that is attributed to the way the network was set up and managed, which was out of our hands. Transfer protocols were a limiting factor. There's still some work to be done."

PHONE: (800) DIGITAL

VIRUS PROTECTION SOFTWARE

VIRUSNET

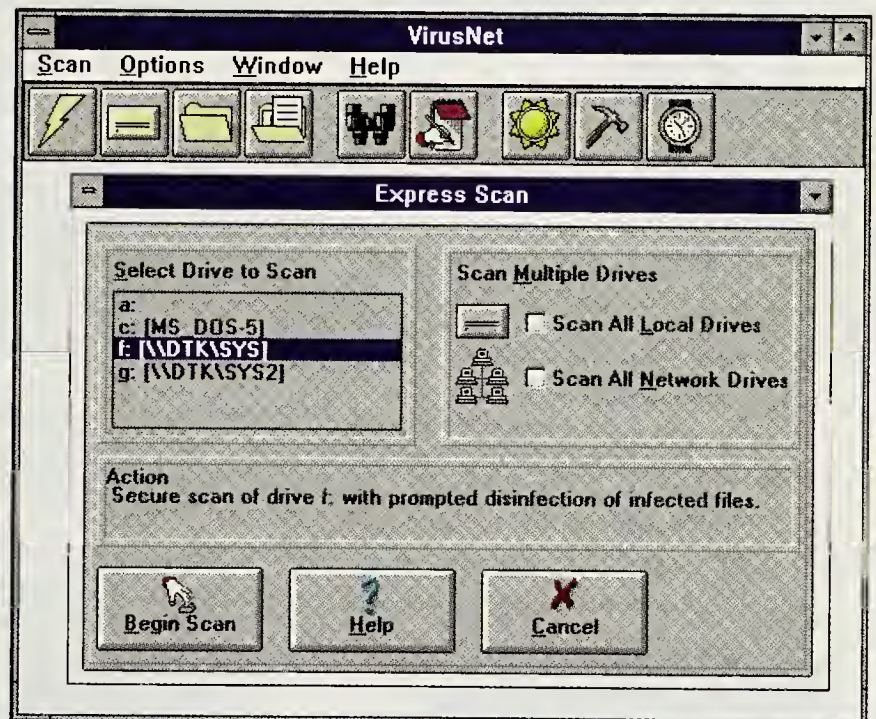
Security Integration, Inc.
Lexington, Mass.

WHAT: VirusNet LAN software allows network administrators to automatically configure and update every PC on the network with antivirus protection in under 10 minutes. A LAN scheduler built on top of VirusNet's F-prot engine allows administrators to automate a variety of tasks, such as performing virus

WHEN: Shipping since October; sold via direct sales force.

HOW MUCH: \$50 per copy; discounts available via site license purchases. Free maintenance for first six months; additional maintenance costs about 30% of total license fee.

USER FEEDBACK: Arkwright Mutual Insurance Co. in Waltham, Mass., implemented VirusNet last September using the automatic scheduler to scan and disinfect each PC (i.e., hard drive) as it boots up. VirusNet's shield application



VirusNet can scan networked PCs in a variety of ways

scans or automatic dial-up file transfers. Virus scans can be done during workstation boot-up or network log-in or from Windows. The application contains a RAM-resident program that continually shields the PC from infestation.

Security Integration posts antidotes to new viruses on a bulletin board, which can be downloaded to VirusNet LAN.

WHERE: Works with Novell NetWare, Banyan Systems, Inc.'s Vines and Microsoft Corp.'s LAN Manager. It requires only 3K bytes of RAM on the client PC.

is resident on the server, said Richard Dunn, senior systems programmer. The software helped the 11,000-PC firm eradicate 15 different infections, five of which were found when the program was installed, three of which have been detected since that time and the balance of which have been prevented from entering the enterprise network.

"Because it's written in assembly code, the program is very small and efficient, but you still get 100% functionality," Dunn said.

PHONE: (617) 861-8800

NetWare 4.1

Novell, Inc., Provo, Utah ☎ (801) 429-7000

INSTALLATION DESCRIPTION OF USERS THAT HAVE INSTALLED NETWARE 4.1	FINANCIAL SERVICES	ENGINEERING FIRM	COMPUTER VENDOR	UNIVERSITY
MIGRATION PLANS	Division's 40 NetWare 3.x servers to move to 4.1 by March; rest of company to follow	Number of sites migrating this month; more general migration over next six months	Began installing several production servers in December, when Version 4.1 began shipping	Moving about 45 NetWare 3.x servers to Version 4.1 "as fast as we can."
OTHER TYPES OF SERVER OPERATING SYSTEMS, NETWORK OPERATING SYSTEMS	Sun Microsystems, Inc.'s Solaris	NT, assorted Unix, Banyan Systems, Inc.'s Vines	Hewlett-Packard Co.'s HP/UX, Microsoft Corp.'s LAN Manager	Unix
CLIENT OPERATING SYSTEMS	Windows; evaluating Windows NT 3.5	Macintosh, Windows, Unix	Windows, Unix	Windows, Windows NT, Macintosh
MAIN REASONS FOR WANTING NETWARE 4.1	SFT III; NDS prune, merge and graft tools	NLSP; Macintosh support; better NDS configuration tools; better reliability, stability	NLSP	Integration of Message Handling Service with NDS; Macintosh support

The Client/Server Journal Firing Line is an evaluation based on interviews with major users at corporate and educational installations. The product under review is being used in a test environment. Ratings are based on user expectations on a 1-to-5 scale, where 1 is below expectations and 5 is above expectations. Ratings are listed in order of importance to users.

OVERALL RELIABILITY, STABILITY

COMPUTER VENDOR	8
FINANCIAL SERVICES	10
UNIVERSITY	10
ENGINEERING FIRM	8

PERFORMANCE

COMPUTER VENDOR	8
FINANCIAL SERVICES	10
UNIVERSITY	10
ENGINEERING FIRM	8

NETWARE 3.X SUPPORT

COMPUTER VENDOR	8
FINANCIAL SERVICES	10
UNIVERSITY	8
ENGINEERING FIRM	8

NDS SETUP AND CONFIGURATION, MIGRATION FROM 3.X

COMPUTER VENDOR	6
FINANCIAL SERVICES	10
UNIVERSITY	8
ENGINEERING FIRM	8

NW ADMIN (MOVES, CHANGES, USER ACCOUNT ADMINISTRATION)

COMPUTER VENDOR	8
FINANCIAL SERVICES	10
UNIVERSITY	8
ENGINEERING FIRM	8

EASE OF USE

COMPUTER VENDOR	8
FINANCIAL SERVICES	10
UNIVERSITY	8
ENGINEERING FIRM	6

UNIX-TO-NETWARE NETWORKING

COMPUTER VENDOR	10
FINANCIAL SERVICES	10
UNIVERSITY	6
ENGINEERING FIRM	7

NLM SUPPORT (THREE USERS)

COMPUTER VENDOR	6
FINANCIAL SERVICES	6
UNIVERSITY	8

MANAGEMENT (TROUBLESHOOTING, ASSET CONFIGURATION: SERVERS, CLIENTS) (THREE USERS)

COMPUTER VENDOR	6
FINANCIAL SERVICES	10
UNIVERSITY	10

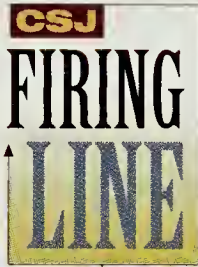
Novell's NetWare 4.1 Worth the Wait

IMPROVED MIGRATION AND NDS CONFIGURATION TOOLS RECEIVE THUMBS-UP FROM USERS

Released in December, about nine months late, NetWare 4.1 is finally the enterprise network services platform Novell, Inc. has been promising, said four users who extensively tested the beta version.

With 4.1, Novell has addressed the major problems that plagued earlier versions of the network services platform: bandwidth-hogging network protocols, buggy code and sluggish server performance.

Novell also appears to have resolved user complaints that NetWare 4.01 and 4.02 lacked key features to ease the migration from NetWare 3.x—in particular, full support of 3.x servers for the NetWare Directory Services (NDS) and tools to configure and



maintain NDS directories.

Still, this latest version is not perfect. The main complaint users had was that NetWare 4.1 and NDS are still missing support from key NetWare Loadable Modules (NLM). While NDS clients can access such NLMs via bindery emulation, LAN administrators must still manage this access separately from NDS. They cannot use NW Admin, NDS's graphical user interface (GUI)-based administration tool, for such NLMs.

Nevertheless, all four users testified that they now feel comfortable bringing the benefits of NetWare 4.x's global directory and centralized user account administration to their mission-critical applications.

NDS CONFIGURATION

A major improvement with NetWare 4.1 are tools for re-configuring and merging NDS directory trees and for grafting and pruning branches. But migrating from 3.x to 4.x is still no picnic, users said.

ENGINEERING: "In the older 4.x versions, you had to do NDS exactly right. If you made a mistake, you could corrupt the directory easily, and it would be difficult to impossible to fix. My comfort level still isn't there, though; I have heard people here say that it is

almost easier to go to 4.x from a non-NetWare background than to go from 3.x."

FINANCIAL SERVICES: "With the 4.1 [merge and grafting tools], you don't have to design the tree beforehand; you can put it in piecemeal, cut and paste as you want. You can create each departmental tree, get it right, [set up] security, then merge it into the main tree."

ADMINISTRATION

Version 4.1 has significantly extended the range, ease of

use and power of NW Admin. However, Novell still needs to integrate NW Admin with its NetWare Distributed Management Services and add capabilities in the client asset management and configuration area, users said.

COMPUTER VENDOR: "They improved NW Admin's filtering capabilities. . . . What I would like to see in the future is allowing NW Admin to do all server console management via the GUI. Right now, you just get to run a remote console [on a server]. I'd like to

see Novell provide something like Microsoft's System Management Server, with client asset and configuration management from the server."

WIDE-AREA NETWORKING

The introduction of NetWare Link Services Protocol (NLSP) translates into more efficient communications among NetWare servers over a WAN, users said. The older IPX, RIP and SAP protocols are notorious for glutting available bandwidth by requiring servers to broadcast their presence regularly. NLSP lets users decide how often servers update one another.

COMPUTER VENDOR: "We had a real problem with traffic going over the wire using the NetWare 3.x version of IP Tunnel [which puts TCP/IP packets over an IPX link]. A link to Germany cost us about \$25,000 for a two-month period when we were not even doing data transfers—just had the link up. With NLSP, we paid \$2,000 over the same period."

ENGINEERING: "The only drawback is that only Novell's Multiprotocol Router supports [NLSP]—the major router companies [don't support it] yet."

SFT III

Support for SFT III, Novell's dynamic server mirroring software, lets Version 4.1 users back up NDS directories, which form the core of the enterprise network services platform.

FINANCIAL SERVICES: Compared with Version 3.x, "4.1 is much better. It can mirror AppleTalk and AppleFile and the Network File System Server."

COMPUTER VENDOR: "SFT III

Please turn to next page

Continued from page 63
will become more important to us over the next year, particularly as major production servers come on-line. We use just disk duplexing right now, but if something other than a disk subsystem goes bad, we lose the whole server. With SFT III, you can lose the whole server and still be up and running."

OVERALL PERFORMANCE

Users agreed NetWare 4.1 runs more efficiently and is less of a CPU and memory hog than previous versions. Furthermore, they said, Novell has vanquished the bugs that plagued earlier versions.

FINANCIAL SERVICES: "Comparing [NLM performance] on NetWare 4.02 vs. 4.1 is like comparing a [low-end car] to a Porsche."

ENGINEERING: "I am much more comfortable with the product as a whole, plus the inefficiencies are not there. We are going to roll with it; I

feel this product is going to work."

NLM SUPPORT

Users said that while a number of key NLMs now support NetWare 4.1 and NDS, some key NLMs from both Novell and third parties are still NetWare 3.x-based.

UNIVERSITY: "I'd like to see more NLMs straight NDS-aware. Even in this version, most print servers have to deal with bindery emulation."

FINANCIAL SERVICES: "The CD-ROM NLM is much improved; all standard CD-ROM devices we use work perfectly. . . . On the minus side: NetWare for SAA's current release works with 4.1 in bindery mode. Some third-party NLMs, like [Symantec Corp.'s] Central Point anti-virus software, still use bindery emulation."

SUPPORT OF UNIX PROTOCOLS

Users have blamed Novell in the past for dragging its heels

in providing full NetWare support for TCP/IP and other Unix-oriented networking protocols such as Network File System. However, Novell addressed many of these gaps when it released NetWare 4.1.

FINANCIAL SERVICES: "The Network File System Services NLM Version 2 [now in beta testing] fully utilizes NDS and does not require bindery emulation. Also included is a Domain Naming Service to NDS facility on the server, which allows you to have one log-in and one password" across NetWare and Unix-based servers.

ENGINEERING: "NetWare IP is still partially IPX on top of IP; to maintain compatibility with applications in the NetWare world, you still need to support IPX. You have to purchase [Novell's] LAN Work- place to get Telnet and FTP."

CLIENT SUPPORT

Users were happy with 4.1's support of Macintosh clients,

enabling them to access NDS and be administered via NW Admin. But full 4.1 support of the more leading-edge Microsoft Corp. client environments is still in the works.

UNIVERSITY: "Support for the Macintosh is great. However, only Microsoft offers a Windows for Workgroups client for NetWare 4.x, and it doesn't support NDS. Novell is working on a Windows 95 client that will."

NETWARE 3.X SUPPORT

Users were extremely happy with 4.1's Netsync feature, which links 3.x servers and their clients to NDS directory trees on 4.1 servers.

COMPUTER VENDOR: "You can now see 3.x servers from NW Admin. I'm very happy about that; it will be a long time before we get rid of our 3.x servers." ■

Compiled by Elisabeth Horwitt, a freelance writer in Waban, Mass.

Novell Responds

LACK OF MICROSOFT CLIENT SUPPORT:

Windows for Workgroups is a peer-to-peer network operating system; the NetWare requestor will get you to NetWare 4.x and NDS just fine. We have an NT client with full NDS support in beta testing; commercial shipment is scheduled for early this year. We are working closely with Microsoft on a Windows 95 client.

MANAGEMENT AND ADMINISTRATION:

NDS can define directory objects for keeping track of a user's computer configuration. However, entry is manual. . . . A client asset management product is in the works.

INTEGRATION OF NMS AND NW ADMIN:

Right now, NMS provides the physical view

of the network; NW Admin shows the logical view. It is our stated development direction to move into a single console where the user can select either the physical or logical view, but this . . . will arrive late [this year] at the earliest.

NW ADMIN TO DO ALL SERVER MANAGEMENT: We are working on it.

WIDE-AREA NETWORKING: Cisco, Wellfleet and 3Com will announce NLSP support around the same timeframe as Version 4.1 ships. Users can provide NLSP support for NetWare 3.x by purchasing Multiprotocol Router Version 3 separately — it comes bundled with NetWare 4.1.

NDS CONFIGURATION: 3.x users are still

accustomed to [3.x utility] Syscon and its Seaworthy menuing (full-screen DOS).

LACK OF NLM SUPPORT: A range of third-party vendors . . . are slated to announce NDS support for their products in the near term. And all future releases of Novell NLMs will support NDS. We are working with Central Point to allow NW Admin to administer its antivirus software.

UNIX NETWORKING: NetWare 4.1 comes with a coupon for getting Dynamic Host Control Protocol (DHCP) free. But Novell provides no way to centrally manage NetWare IP clients via DHCP until NetWare IP Version 2 comes out in March. . . . The ability to manage IP clients via NW Admin will come at a future date.

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Change Is Our Friend

**PEOPLE WILL
MORE LIKELY
WEATHER THE
CHANGES OF
CLIENT/SERVER
IF THE REASONS
FOR CHANGE ARE
PROPERLY COM-
MUNICATED.**

I was driving to a vendor site recently with our manager of information technology, Alan Mariotti, when we passed a sign: "Please pardon our construction, we're working hard to build a better roadway." Alan turned to me and said, "You know, we need to supplement communication of our client/server network re-engineering effort in a similar way."

As a result, our team at Allied-Signal has embarked on a number of initiatives designed to better communicate with the rest of IS and user departments. Though there are no guarantees, people will more likely weather the cultural and technological changes wrought by client/server and revamped business processes if the reasons for those changes are properly communicated.

To start, we printed a friendly "what, why, where and when" pamphlet (with a phone number for feedback and questions) to explain our client/server project to users.

We've done some other things as well to facilitate enhanced intracompany communications. For example, I've done a number of "town hall" presentations to better explain our client/server rationale. I've already given the presentation to the IS staff and top management and will soon present it to other groups within the corporation.

In addition, successful client/server projects must be properly mapped out. That means you must early on identify and describe the workflow and information flow in the organization. To whatever degree possible, this analysis should drive the design of your distributed computing environment.

When your plan is ready, move to the next step: Share it with impacted members of the IS team and user groups. You minimize opportunity for failure if you get feedback before, during and after deployment. After all, you're talking about their living environment.

Clearly, people issues abound during wholesale changes in any organization. Changes take on highly charged meanings in IS, where emotional ties to hardware and software often take on religious overtones. Odds are that migration to a new distributed system will mean altering platforms and products. This may cause some IS employees discomfort because change forces them

to perhaps question their technological faith.

Have your human resources department work with affected employees to illustrate how skills learned during advanced technology projects elevate their importance within the organization and their marketability.

Getting employees to embrace changes in their IS environment can happen only if your organization provides powerful incentives. Outside of titular promotions and huge sums of cash, useful training courses demonstrate the investment you are making in people. That and the challenge of learning something new can often be incentive enough to get staffers on the bandwagon.

To help ease the transition — and forge a bona fide client/server culture — you should establish consistent IS standards. Standards are important because every piece of hardware and software has the potential to be a little different on everyone's LAN. Allied-Signal started with Gartner Group's "tier one" PCs (Compaq and IBM) as a baseline desktop hardware standard and Microsoft's Office product as a core business application suite. This helped us create a one-company culture in which sharing information from France to Florida is no more difficult than sharing information between offices across the hall.

By following some of these guidelines, you give users reasons to "pardon your appearance" as you build them a more useful distributed computing roadway. ■



**ERIC
SINGLETON**

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THE 5TH WAVE



"ODDLY ENOUGH, THIS HAS BEEN THE LEAST DISRUPTIVE PART OF OUR MOVE TO CLIENT/SERVER COMPUTING."

Conferences

■ NETWORKS EXPO '95

Boston, Feb. 14-16

Contact: Bruno Blenheim, Inc., Fort Lee, N.J. (800) 829-3976.

■ CLIENT/SERVER WEST CONFERENCE AND EXPOSITION

San Jose, Calif., Feb. 14-17

Contact: CMP Trade Show & Conference Services, Jericho, N.Y. (516) 733-6700.

■ ANALYSIS AND DESIGN OF CLIENT/SERVER SYSTEMS

Orlando, Fla., Feb. 15-17

Also being held March 14-16 in Chicago. Contact: Technology Transfer Institute, Santa Monica, Calif. (310) 394-8305.

■ INTRODUCTION TO CLIENT/SERVER COMPUTING

Atlanta, Feb. 21-22

Also being held Feb. 23-24 in Washington. Contact: Technology Transfer Institute,

Santa Monica, Calif. (310) 394-8305.

■ MANAGING THE CLIENT/SERVER MIGRATION

Washington, Feb. 27-March 1

Contact: Technology Transfer Institute, Santa Monica, Calif. (310) 394-8305.

■ UNIFORUM

Dallas, March 12-16

Contact: The Interface Group, Needham, Mass. (617) 449-6600.

■ INTERNET SUMMIT CONFERENCE

New York, March 14-15

Contact: CMP Trade Show & Conference Services, Jericho, N.Y. (516) 733-6700.

■ WORKGROUP COMPUTING STRATEGIES

Tampa, Fla., March 20-22

Contact: Meta Group, Stamford, Conn. (203) 973-6700.

Book Reviews

■ TOTAL IMPROVEMENT MANAGEMENT: THE NEXT GENERATION IN PERFORMANCE IMPROVEMENT, H. James Harrington

You've re-engineered your corporation, but you're still not seeing the benefits you want. Using a new methodology called Total Improvement Management, this book steps you through the process of doing better business by improving the performance of the organization and the quality of the product. *Total Improvement Management* has been culled from the best practices of such management techniques as Total Quality Management, Total Technology Management, Total Resource Management, Total Productivity Management, Total Business Management and Total Cost Management. However, for a book dedicated to quality, it has an abundance of spelling and grammatical errors. The 488-page book costs \$29.95. ISBN: 0-07-026770-7. McGraw-Hill, Inc. (800) 2-MCGRAW.

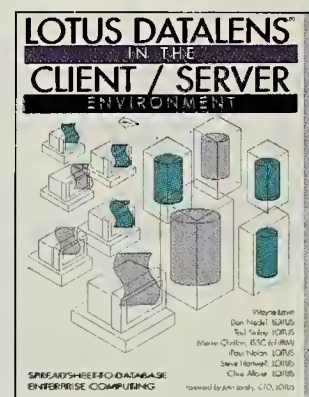
■ LOTUS DATALENS IN THE CLIENT/SERVER ENVIRONMENT, Wayne Lavitt, Don Nadel, Tad Staley, Martin Chetlin, Paul Nolan, Steve Hartwell and Chris Allaire

Don't let the title daunt you: If you want information about client spreadsheet access to corporate and PC database servers, *Lotus DataLens in the Client/Server Environment* is worth the read. Written in a user-friendly manner and sprinkled with hands-on examples, the book explores the use of DataLens in the client/server world without a heavy academic bent. Building on a user's experience with Lotus' 1-2-3, this book shows you how to gain corporate advantage by drawing on large databases from a variety of sources. The 474-page tome is priced at \$36.95. ISBN: 0-442-01514-3. Van Nostrand Reinhold (800) 842-3636.

Other books to consider:

■ **COMPUTER-RELATED RISKS**, Peter G. Neumann; 367 pages; \$22.25 for ACM members, \$24.75 for nonmembers; ISBN: 0-201-55805-X. ACM Press Books, ACM order number 704943, (212) 626-0500.

■ **ULTIMATE NETWORK**, Martin Fox; 261 pages; \$34.95 including disk of programs described in book; ISBN: 0-9626660-9-2. Future Communications Systems, Inc. (516) 496-7121.



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